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BEFORE THE BOARD OF LAND AND NATURAL RESOURCES
STATE OF HAWAII

In Re Conservation District Use Permit)	DLNR File No. HA-11-05 (CDUA HA-
Application HA-3568 for the Thirty Meter)	3568)
Telescopes on the Northern Plateau in the)	
Mauna Kea Conservation District, Ka`ohe,)	PETITIONERS' COMBINED
Hamakua District, Hawai'i TMK (3) 4-4-)	PROPOSED FINDINGS OF FACT,
015:009)	CONCLUSIONS OF LAW, DECISION
		AND ORDER

PETITIONERS' COMBINED PROPOSED FINDINGS OF FACT,
CONCLUSIONS OF LAW, DECISION AND ORDER

The University of Hawaii at Hilo, an entity of the state university of Hawaii (hereinafter referred to as "The University" or "Applicant"), filed an application for a Conservation District Use Permit (hereinafter referred to as "CDUA") on September 2, 2009, pursuant to chapter 183C of the Hawaii Revised Statutes (hereinafter "HRS") and chapter 13-5 of the Hawaii Administrative Rules (hereinafter "HAR") for the construction of a Thirty Meter Telescope (hereinafter referred to as "TMT" or "project") on the northern plateau of the conservation district on Mauna Kea in the Mauna Kea Science Reserve, Ka`ohe Mauka, Hamakua, Hawai'i, TMK (3) 4-4-015:009.

The State of Hawaii Board of Land and Natural Resources (hereinafter referred to as "BLNR"), having heard and examined the testimony, evidence, and arguments of all parties, hereby makes the following Findings of Fact, Conclusions of Law, and Decision and Order denying CDUA HA-3568 for the TMT.

PART ONE: FINDINGS OF FACT

I. Procedural Matters

I. Thirty Meter Telescope CDUA HA-3568

A. Public Hearings

1. Public hearings on CDUA HA-3568 for the proposed Thirty Meter Telescope (TMT) in the Mauna Kea Conservation District, Mauna Kea Science Reserve, Ka'ōhe Mauka, Hamakua, Hawa'ii, TMK (3) 4-4-015:009 were held:
2. on December 2, 2010 at the Hawaii County Council Room, 25 Aupuni Street in Hilo,
3. on December 3, 2010, at the Natural Energy Laboratory in Kona. (Ex. Jt-16/A-316)
4. On February 25, 2011, the Board of Land and Natural Resources (BLNR) held a public hearing in Honolulu and voted to approved the CDUA HA-3568 for the Thirty-Meter Telescope in the Mauna Kea Conservation District, Mauna Kea Science Reserve, Ka'ōhe Mauka, Hāmakua, Hawai'i. (Ex. Jt-16/A-316)
5. On February 25, 2011 and March 7, 2011, the Office of Conservation and Coastal Lands (OCCL) received seven requests for a contested case hearing on CDUA-HA-3568, in compliance with HAR 13-1-28, from Mo'oinanea (represented by E. Kalani Flores), the Flores-Case 'Ohana, Deborah J. Ward, Paul K. Neves (as an individual and as representative of the Royal Order of Kamehameha I (ROOK)), Clarence Kūkauakahi Ching, KAHEA: The Hawaiian-Environmental Alliance (represented by Marti Townsend), and Mauna Kea Anaina Hou (represented by Kealoha Pisciotta). (Ex. Jt-16/A-316, Jt-20/A-320)

B. Ex Parte Communications

6. On March 21, 2011, all parties were given written notification of the prohibition against *ex parte* communications.
7. On April 4, 2011, Petitioner KAHEA requested that DLNR and the Applicant cease all *ex parte* communications regarding the development of regulations for

commercial activity on Mauna Kea.

C. Hearing Officer

8. On April 15, 2011, the BLNR Chairperson appointed Mr. Paul Aoki as the presiding officer over the contested case hearing (hereinafter Mr. Aoki is referred to as "Hearing Officer" or "HO"). (Min. Ord. 1, April 15, 2011)
9. On April 18, 2011, Petitioners Pisciotta, Ching, Ward, KAHEA, and Neves filed objections to the designation of the Hearing Officer and requests to reschedule the Pre-Hearing Conference.
10. On April 29, 2011, the HO issued Minute Order 3 denying the request of some petitioners for an extension of time for the Pre-Hearing Conference.
11. On May 2, 2011, the BLNR Chairperson issued Minute Order 2 denying Petitioner's Motion to Disqualify Hearing Officer.
12. On May 10, 2011, Petitioners filed two separate motions for reconsideration of request to reschedule the Pre-Hearing Conference and one motion for reconsideration for a new HO.
13. On May 11, 2011, the HO issued Minute Order 4 denying Petitioners' motions for reconsideration of request for time extension.
14. On May 16, 2011, the BLNR Chairperson issued Minute Order 5 denying the motion for reconsideration for a new HO.

D. Parties

Applicant University of Hawai'i at Hilo

15. The Applicant, University of Hawai'i at Hilo (UH-Hilo), is seeking a Conservation District Use Permit (CDUP) relative to CDUA HA-3568 on behalf of TMT Observatory Corporation ("TMT"). Ex A-311 p.13, K-1 (CDUA)
16. The Agent (signatory) for the Applicant UH-Hilo on CDUA HA-3568 is Dr. Donald Straney, Chancellor. Ex A-311 p1 of Item K-1, (CDUA)

17. Dr. Donald Straney is the Chancellor of UH-Hilo. Ex A-311 p.1, K-1, (CDUA)
18. UH-Hilo is a subdivision of the University of Hawaii System. Ex. A-301, 3-9
19. The University of Hawaii System was established as an institution of higher education. Its purpose is: “to give thorough instruction and conduct research in, and disseminate knowledge of, agriculture, mechanic arts, mathematical, physical, natural, economic, political, and social sciences, languages, literature, history, philosophy, and such other branches of advanced learning as the board of regents from time to time may prescribe and to give such military instruction as the board of regents may prescribe and that the federal government requires...” (HRS §304A-102)
20. Conservation land management is not listed as a purpose of the University system. HRS 304A-102.
21. Upon approval of the UH Comprehensive Management Plan (UH CMP or CMP), the BLNR made the University Board of Regents (UH BOR) responsible for implementing the CMP. In accepting that responsibility, the UH BOR delegated implementation of the CMP through normal UH governance channels to UH Hilo, OMKM, and MKMB and also assigned two members of the UH BOR to sit as ex-officio, nonvoting members on the MKMB. Ex A-308 FEIS section 3.10 Land Use Plans, Policies and Controls p 3-148
22. OMKM, the Office of Mauna Kea Management was formed in 2000 by the UH BOR and is part of UH-Hilo. (Ex A-301 CMP P 3-9).
23. The OMKM has primary responsibility for managing the UH Management Areas, ensuring the coordinated planning and execution of activities so they are consistent with applicable legal mandates, authorities, and policies. A-301, p. 3-1.
24. OMKM is responsible for ensuring compliance with and implementation of the 2000 Master Plan. Ex A-301 CMP P 3-8
25. OMKM has two staff members, who report directly to the UH-Hilo Chancellor. Nagata, Tr. 8.17.11, p. 145:10-12; Ex. A-301, p. 3-9.
26. OMKM has two primary advisory entities: 1) Mauna Kea Management Board (MKMB) and 2) Kahu Ku Mauna. Ex. A-301, p. 3-11

27. The MKMB is comprised of seven members, plus two UH-BOR members ex-offio, who advise UH-Hilo and OMKM. Ex. A-301, p. 3-11
28. MKMB members are nominated by the UH-Hilo Chancellor and approved by the UH-BOR. Ex. A-301 p. 3-11
29. Kahu Ku Mauna advises MKMB, OMKM, and UH-Hilo regarding Hawaiian cultural matters affecting the UH Management Areas. Ex. A-301, p 3-11
30. Kahu Ku Mauna members are approved by the MKMB. Ex. A-301, p 3-11
31. If a CDUP for the TMT project were granted, UH-Hilo would be the named permittee, but the TMT Observatory Corporation would be the entity constructing and operating the TMT. Nagata, Tr. 8.17.11, p. 215:6-22
32. The TMT Observatory Corporation was founded by the California Institute of Technology, the University of California, and the Association of Canadian Universities for Research in Astronomy. Ex A-311 p.13, K-1 (CDUA)
33. California Institute of Technology, the University of California, and the Association of Canadian Universities for Research in Astronomy are they are listed as founders only.
Ex A-311 p.13, K-1 (CDUA)
34. The TMT Observatory Corporation is represented by Dr. Gary Sanders. Sanders, Tr. 8.15.11, p 81
35. Douglas Ing is currently an attorney for the TMT Observatory Corporation. Ing, Tr. May 13, 2011, 4:21-23
36. The University has spent over \$1 million in legal fees related to Mauna Kea. Ex. B-19

Petitioner Mauna Kea Anaina Hou

37. Mauna Kea Anaina Hou is an organization of Native Hawaiian cultural practitioners, who have genealogical ties and/or who engage in traditional and customary practices related to Mauna Kea. (Ex. A-320, page 6, Ex. C-1, page 1)

38. Kealoha Pisciotta is president of Mauna Kea Anaina Hou. (Ex. A-320, page 6, Ex. C-1, page 1)
39. Ms. Pisciotta engages in traditional and customary practices related to Hawaiian astronomy, cosmology, and la`ua lapa`au on Mauna Kea. (Ex. A-320, page 6, Ex. C-1, page 1)
40. The practices of Ms. Pisciotta were taught to her by her elder family members. (Ex. A-320, page 6, Ex. C-1, page 1)
41. Construction of the TMT would introduce a new, large built structure into the natural, open space of the northern plateau on Mauna Kea, thus obscuring important star alignments and interrupting other viewplanes to and from the summit area. (Pisciotta, Tr. September 26, 2011, p. 90: 14-17).
42. If built, the TMT would increase the intensity of industrial human activity on Mauna Kea, which will further degrade the ability of her and others to gather for la`au lapa`au purposes. (C-1 Pisciotta, WDT. p 8).
43. Ms. Pisciotta is also a former a telescope technician. She worked on the James Maxwell Telescope on Mauna Kea. (Ex. C-1 page 1)
44. The Applicant agreed that Ms. Pisciotta has standing to participate in this contested case hearing. (Lui-Kwan, Tr. May 13, 2011, 45:22-46:4)
45. On May 27, 2011, the HO issued Minute Order 6 granting Ms. Pisciotta standing in this contested case hearing. (Min. Ord. 6; Aoki, Tr. May 13, 2011, 6:17-23, 46:19-47-10 and 82:17-25)

Petitioner Kumu Hula Paul K. Neves

46. Paul K. Neves is a Native Hawaiian practitioner of hula and kumu hula. (Ex F-01, Neves, WDT p 1)
47. Mr. Neves has genealogical ties to Mauna Kea and Haleakala. (Ex A-320, Neves, p 17)
48. As a member of the Royal Order of Kamehameha I, Mr. Neves continues to engage in traditional and customary practices on Mauna Kea, such a celebrations of the solstice. (Ex F-01, Neves, WDT p 1, Ex A-320, Neves, p 17)

49. Construction of the TMT would harm his traditional and customary practices on Mauna Kea by introducing a new, significant man-made structure into the natural, open space of Mauna Kea. (Neves Tr 9.30.11 p 46: 21-25)
50. If built, the TMT would interrupt important viewplanes between Mauna Kea and Haleakala. (Neves Tr 9.30.11 p 47: 20-25)

Petitioner Deborah J. Ward

51. Petitioner Deborah J. Ward is a recreational hiker who has been walking for 40 years on Mauna Kea to experience the trails and visit the summit of Mauna Kea, during the 1970's through to present, for recreation, wilderness experience, unfettered vistas, silence, spiritual peace, natural beauty, and cultural significance. (Ex. D-1, page 1).
52. Ms. Ward has led hikes on Mauna Kea for groups including the Honolulu Botanic Gardens, since the 1970's, and Hawaii Community College, 4-H Youth Development Program, and High School Hikers, as a UH faculty member since the 1980's. (Exhibit D-1 , page 1)
53. Ms. Ward has experienced the cumulative impact of the destruction of habitat, widespread waste accumulation, obstruction of viewplanes, constant sound, alteration of the geology, and negative impact to the cultural practice during 40 years of recreational hiking and teaching on Mauna Kea. (Ex. D-1, page 2)
54. Ms. Ward's stated goal is to preserve and protect the natural resources from degradation. Her recreational practices and scientific interests and longstanding history in this issue are distinct from that of the general public. (Ex. Jt-20/A-320, page 47)
55. Ms. Ward brought her concerns to this case because, as a long-time recreational user, she felt it was her citizen's responsibility to participate in hearings and meetings held to review, plan and propose appropriate management of the natural resources associated with Mauna Kea. She contributed hundreds of hours as a volunteer to this effort without monetary compensation. (Ward, Tr. September 30, 2011, p 67 8-21)
56. Ms. Ward demonstrated she has knowledge and information useful to the BLNR in making an informed decision regarding the protecting the Mauna Kea Conservation District. (Ex. Jt-20/A-320, page 47).

57. Ms. Ward hikes to experience the wilderness, the ecosystems and habitats for native species, the constantly changing weather, the play of light on the landscape, the serenity of silence, the revelation of ancestral and spiritual wisdom, and numerous intangible aspects of the environment on Mauna Kea. (Ward, Tr. September 30, 2011, p 68 11- 16)
58. The steady deterioration of the natural landscape, including the intrusion of visual distractions, noise, trash, traffic, and access limitations has significantly degraded her recreational experience on the summit. (Ward, Tr. September 30, 2011, 17-21)
59. Ms. Ward testified that the Applicant's characterization of the TMT as a "new visual element on the northern plateau" is a significant understatement. The development of over 5 acres of industrial infrastructure for the TMT on the last remaining unobstructed view plane facing Haleakala would significantly undermine her recreational practices. (Ex. D-1, page 2)
60. Ms. Ward testified that telescopes are visual obstructions that cause adverse impacts to the hikers' wilderness experience. (Ex. D-1, page 2)
61. Ms. Ward has experienced the noise of observatory air conditioning, blowers, generators, associated vehicles and industrial activity and has found it disturbing to recreational users. (Ex. D-1, page 2)
62. Ms. Ward testified that the multiple telescope domes on the summit of Mauna Kea are visual obstructions from any vantage point, and cause adverse impact to the natural beauty of Mauna Kea, which thereby undermines recreational enjoyment of the mountain. (Ex. D-1, page 3)
63. Ms. Ward testified that she escapes the buildings and roads that have intruded on the natural vistas of the summit by walking to the northern plateau, where wilderness landscapes remain intact. p 69 22-25, p 69 1-4
64. For this reason, Ms. Ward maintains that the proposal to build the TMT on the northern plateau of Mauna Kea's summit region would further degrade, despoil, and irrevocably harm her rights to a clean and healthful environment. p 69 5-8
65. Ms. Ward observed first-hand actions by the University's Institute for Astronomy (IfA) and Department of Land and Natural Resources (DLNR) staff that directly violated conditions set forth in the BLNR- approved Mauna Kea Management Plan in 1996. These actions included alteration to slopes and filling of inner

- cinder cone of Pu`u Hau Oki, and trenching of the outer slopes, affecting high quality Wekiu bug habitat. (Ex. D-1, page 2)
66. Ms. Ward participated in meetings with BLNR archaeologist Holly McEldowney and USFWS biologist Steve Miller, and Bishop Museum entomologist Frank Howarth, to identify resource protections absent from the practices of the University's IfA and DLNR, which led to these violations of the 1985 Mauna Kea management plan protections. (Ex. Jt-20/A-320, page 48)
 67. Ms. Ward assisted in efforts to procure a Legislative Auditor's report in 1998, and participated in the process to develop the University's Mauna Kea Master Plan 2000 and the Keck/NASA Outrigger Environmental Assessment process. (Ex. Jt-20/A-320, page 48)
 68. Ms. Ward has served at the request of the Office of Mauna Kea Management (OMKM) on the OMKM Environment Committee since December 2000. (Ex. D-1, page 2)
 69. Ms. Ward worked with a committee of scientists working in the fields of biology, geology and environmental management, who together formulated recommendations for biological inventory and monitoring in 2002, and refined the natural resource monitoring and protection actions needed in 2005. (Ex. D-1, page 2)
 70. The Applicant agreed that Ms. Ward has standing to participate in this contested case hearing. (Lui-Kwan, Tr. May 13, 2011, 45:22-46:4)
 71. On May 27, 2011, the HO issued Minute Order 6 granting Ms. Ward standing in this contested case hearing. (Min. Ord. 6; Aoki, Tr. May 13, 2011, 6:17-23, 46:19-47-10 and 82:17-25)

Petitioner Clarence Kukaukahi Ching

72. Clarence Kukaukahi Ching is a Native Hawaiian and traditional subsistence practitioner.(Ex E-1 Ching WDT p 3, Ching 9.30.11 Tr p 81: 19-20)
73. Mr. Ching has hiked nearly every known ancient and modern trail of Mauna Kea.(Ex E-1 Ching WDT p 1, Ex A-320, Ching, p 37)
74. Mr. Ching engages in these hu`aka`i to walk in the footsteps of his kupuna.(Ex E-1 Ching WDT p 1Ex A-320, Ching, p 37)

75. Mr. Ching has led others on hu`aka`i on Mauna Kea. (Ex E-1 Ching WDT p 1)
76. Mauna Kea is Mr. Ching's temple and spiritual retreat. He enjoys it for the quiet and many other intangible features that make Mauna Kea so unique and special. Ching 9.30.11 Tr p 92: 1-3, p 82: 18-24)
77. If built, the TMT would further degrade his the ability to gather water for la`au lapa`au purposes and would undermine Mr. Ching's traditional and customary practices on Mauna Kea. (Ex A-320 Ching p 37)

Petitioner Flores-Case Ohana

78. Members of the Flores-Case 'Ohana are Kanaka Maoli (Native Hawaiian) cultural practitioners with substantial interest and connections to Mauna a Wakea and whose interest in this contested case hearing is clearly distinguishable from that of the general public. (Ex. A-318, p. 3)
79. Kalani Flores, B. Pualani Case, Hawane Rios, and Kapulei Flores are members of the Flores-Case 'Ohana. (Ex. A-318, p. 1)
80. Members of the Flores-Case 'Ohana continue to exercise their traditional and customary Kanaka Maoli (Native Hawaiian) cultural, spiritual, and religious practices connected to Mauna a Wakea. (Ex. A-318, p. 2)
81. The Flores-Case 'Ohana has connected with Mauna a Wākea through divine guidance of Ke Akua (the Creator), ancestral *akua*, and *kupua* connected to and/or presently residing on this mountain through genealogical ties as well as through customary cultural and traditional practices. (Ex. G-1, E. Flores WDT, p. 5, 10)
82. The Flores-Case 'Ohana has genealogical ties to Mo'oinanea, guardian of Lake Waiau who resides on the summit of Mauna a Wakea. (Ex. A-318, p. 2; Ex. G-1, E. Flores WDT, p. 5)
83. Petitioners, Ms. Case and Mr. Flores, were qualified as experts to their cultural practices related to Mauna Kea in this contested case hearing. (T. Lui-Kwan, Tr. Aug. 25, 2011, p. 28:9-15)
84. Mr. Flores was also qualified as an expert in the area of Hawaiian cultural traditions through his knowledge, skills, experience, training, and education in this subject matter. (P. Aoki, Tr. Sep. 26, 2011, p. 6:23-25)

85. Collectively, Ms. Case and Mr. Flores have over 60 years of teaching experience in the area of Hawaiian Studies. They are known as *kumu* (teachers) who have acquired expertise in these areas they specialize in through their knowledge, skills, experience, teaching, education, and age. (B. Case, Tr. Aug. 25, 2011, p. 63:1-12)
86. The Flores-Case ‘Ohana has insights, family traditions, and knowledge not previously disclosed in the CDUA that are useful to the BLNR in making an informed decision regarding the protection of the Mauna Kea Conservation District. (Ex. A-318, p. 3)
87. Ms. Case is a Kanaka Maoli (Native Hawaiian) practitioner of hula and has had her own *halau hula* for over 25 years. (B. Case, Tr. Aug. 25, 2011, p. 63:25, 64:1-3)
88. Ms. Case and her *halau hula* continues to engage in cultural practices, protocols, and ceremony gatherings connected to the Mauna. (B. Case, Tr. Aug. 25, 2011, p. 63:25, 64:1-3)
89. If built, the TMT would cause a substantially new visual obstruction on Mauna a Wakea and would cause a visual and spiritual interference for the Flores-Case ‘Ohana when directing chants and prayers towards the mountain during cultural practices, protocols, and ceremony gatherings. (B. Case, Tr. Aug. 25, 2011, p. 66:14-23)
90. If built, the TMT would cause substantially new disruptions to the life forces and energies that flow into the *piko* of Mauna a Wakea which would have an impact upon the health, safety, and welfare of the Flores-Case ‘Ohana and the general public of Hawai‘i. (Ex. G-1, E. Flores WDT, p. 8-9)
91. On May 27, 2011, the HO issued Minute Order 6 granting the Flores-Case ‘Ohana standing in this contested case hearing. (Min. Ord. 6; Aoki, Tr. May 13, 2011, 6:17-23, 46:19-47-10 and 82:17-25)

Petitioner KAHEA: The Hawaiian-Environmental Alliance

92. The mission of KAHEA: The Hawaiian-Environmental Alliance is to advocate for the protection of environmentally significant and culturally sacred places in Hawaii. (Townsend, Tr. August 25, 2011, 124:24-125:9)

93. As an organization, KAHEA has worked for the protection of Mauna Kea since 2001. (Ex. B-1, page 1)
94. Construction of the TMT would undermine the quality of the natural and cultural resources on Mauna Kea and weaken the application of the laws and regulations that protect conservation districts.
95. Marti Townsend works for and represents KAHEA (Ex. B-1, page 1)
96. Marti Townsend is a licensed attorney with a Certificate in Environmental Law from the University of Hawaii William S. Richardson School of Law. (Ex. B-1, page 1)
97. The Applicant agreed that KAHEA has standing to participate in this contested case hearing. (Lui-Kwan, Tr. May 13, 2011, 45:22-46:4)
98. On May 27, 2011, the HO issued Minute Order 6 granting KAHEA standing in this contested case hearing. (Min. Ord. 6; Aoki, Tr. May 13, 2011, 6:17-23, 46:19-47-10 and 82:17-25)

E. Pre-Hearing Matters

99. On May 2, 2011, the BLNR Chairperson denied the request for a fee waiver for Mo`oinanea and granted the request for a fee waiver for Clarence Kukauakahi Ching.
100. On May 13, 2011, a pre-hearing conference was held on CDUA HA-3568 in Hilo. (Min. Ord. 1, April 15, 2011; Aoki, Tr. May 13, 2011, 4:1).
101. At the pre-hearing conference, the issue of the Petitioners' standing was discussed. Applicant did not object to the standing of petitioners Mauna Kea Anaina Hou, Paul K. Neves, Deborah J. Ward, Clarence Kukauakahi Ching, or KAHEA: The Hawaiian-Environmental Alliance. (Aoki, Tr. May 13, 2011, 6:17-20; Pisciotta, Tr. May 13, 2011, 43:24-46:25)
102. At the pre-hearing conference, applicant challenged the petitions of the Flores-Case Ohana and Mo`oinanea. (Flores, Tr. May 13, 2011, 7:3-25:18 and 26:19-43:20)

103. On May 27, 2011, as a result of the discussion and argumentation at the Pre-hearing Conference, the HO issued Minute Order 6, which denied standing to Mo`oinanea and granted standing to Mauna Kea Anaina Hou, Paul K. Neves, Deborah J. Ward, Clarence Kukauakahi Ching, KAHEA: The Hawaiian-Environmental Alliance, and the Flores-Case Ohana. (Ex. Jt-48/A-348; Aoki, Tr May 13, 2011, 25:19-26:16)
104. On May 27, 2011, parties provided suggestions to the HO for spots on the site visit to the summit of Mauna Kea. Petitioners suggested that the site visit include views of the proposed site from Waimea, the northern ridge of Kukahau`ula and the base and top of Pu`u Poli`ahu, as well as views from the proposed site itself.
105. Petitioners also recommended that the University use a helium filled balloon attached to a 187-foot long rope to demonstrate the height of the proposed project.
106. On August 11, 2011, all parties participated in a site visit to the conservation district of Mauna Kea. Sites visited include: Hale Pohaku electrical substation, various electrical boxes in the Natural Area Reserve, the batchplant, the northern ridge of Kukahau`ula near the Gemini Telescope, the area immediately north of the Subaru and Keck Telescopes, the base and peak of Pu`u Poliahu, the proposed site of the project. (Min. Ord. 8, July 7, 2011)
107. The site visit included a demonstration of the height of the proposed project using a red helium balloon attached to a rope measuring 187 feet long. (Min. Ord. 8, July 7, 2011)
108. The red balloon was visible from the northern ridge of Kukahau`ula, the area immediately north of the Subaru and Keck Telescopes, and the base and peak of Pu`u Poliahu. Hayes, TR. 8.16.11, 78: 1-25, 79: 1-25, p 80: 1-7.

F. Pre-Hearing Motions

109. On July 19, 2011, the Flores-Case Ohana filed a motion to present a witness without written direct testimony for Mo`oinanea.
110. On July 28, 2011, the HO issued Minute Order 9 granting the motion to present a witness without written direct testimony.

111. On July 19, 2011, Petitioners filed a motion to strike evidence from the record that is irrelevant, immaterial, or repetitious.
112. On July 28, the HO issued Minute Order 10 denying Petitioners' motion to strike.

G. Evidence and Experts

113. On August 25, 2011, issues regarding the record were stated on the record. Documents originally kept by OCCL staff was entered into evidence as exhibits of the Applicant. (Lui-Kwan, Townsend, Pisciotto, Ching, Aoki, Tr. August 25, 2011, 5:20-6:19, 9:7-10:2, 11:3-12:1, 12:17-17:4)
114. On August 25, 2011, Petitioners Neves, Ching, Pisciotto, and Flores were recognized as Native Hawaiian cultural practitioners and experts in the traditional and customary practices of Native Hawaiians. (Lui Kwan, Tr. August 25, 2011, 28:4-30:6)
115. On August 25, 2011, Petitioner Marti Townsend was qualified as an attorney. (Aoki, Tr. August 25, 2011, 138:20-23)
116. On September 26, 2011, Flores was also recognized as expert in Native Hawaiian traditions and culture. (Flores, Tr. September 26, 2011, 4:25-6:25)

H. Post-Hearing Matters

117. Request to extend deadline for filing of Proposed Findings of Fact, Conclusions of Law and Decision and Order to after November 16, 2011.
118. On October 28, 2011, HO issued Minute Order 15, setting the deadline for filing Proposed Findings of Fact, Conclusions of Law and Decision and Order to 4:00 p.m. on November 17, 2011.
119. On October 31, 2011, the Applicant requested that judicial notice be taken of 76 Fed. Reg. 207 regarding the candidacy of the Wekiu bug for listing on the Endangered Species List.
120. On November 7, 2011, Petitioners did not object to the submission of the requested information provided that the information submitted by Petitioner Ward was also accepted into the record.

121. On November 14, 2011, the Applicant withdrew its request for judicial notice of 76 Fed. Reg. 207 regarding the candidacy of the Wekiu bug for listing on the Endangered Species List.
122. On November 14 and 16, 2011, Petitioners gave the HO judicial notice of the oral arguments held before the Intermediate Court of Appeals on November 9, 2011, available on-line at:
http://www.courts.state.hi.us/courts/oral_arguments/recordings_archive.html,
accessed November 14, 2011.

II. The Comprehensive Management Plan

A. Related Procedural Background

123. In 2007, the Third Circuit Court overturned the BLNR's decision to approve the Keck Outrigger telescope CDUA because the management plan offered did not meet the standards of HAR 13-5-24 and HAR 13-5-2, which defines "Management Plan" as "a **comprehensive** plan for carrying out multiple land uses." (B-15, page 11, 14)
124. The Third Circuit concluded that a comprehensive management plan must 1) concern conservation of the natural and cultural resources of the district; 2) be "all-covering, all-embracing, all-inclusive..." of the conservation district; and, 3) provide a limit on construction in the conservation district. Mauna Kea Anaina Hou v. BLNR, Civ. No. 4-1-397, 7 (3rd Cir. Haw. Jan, 19, 2007).
125. In 2007, the University hired Dawn Chang, principal of Ku'iwalu Consulting, to write a management plan for Mauna Kea. (Ex. B-41, pages 9, 13)

B. Public Hearings

126. On April 8-9, 2009, the BLNR held a public hearing in Hilo on the University's management plan. (Ex. B-41)
127. At the public hearing, approximately 500 people expressed opposition to the University's Comprehensive Management Plan. Their concerns included:
128. the University's past mismanagement of Mauna Kea's resources;

- 129.the University has a conflict of interest between promoting telescope construction and protecting natural and cultural resources;
- 130.the lack of evidence that the University can or will protect the natural resources of the mountain;
- 131.the lack of a carrying capacity or any limitations, such as size and number of telescopes, to prevent telescopes from becoming a more dominate feature on the mountain;
- 132.the CMP empowers the University to regulate traditional and customary practices;
- 133.the CMP does not concern the entire conservation district;
- 134.the CMP lacks enforceable timelines for studies and future plans;
- 135.(Ex. B-41, pages 19-23, 25-27, 32-33, 34-35)
- 136.On April 9, 2009, The BLNR approved the University’s management plan with several conditions, including the requirement to complete four subplans on the following topics: 1) Public Access, 2) Decommissioning, 3) Cultural Resources, 4) Natural Resources. (Ex. B-41)
- 137.In compliance with HAR 13-1-28, five individuals and organizations (Mauna Kea Anaina Hou, Royal Order of Kamehameha I, Sierra Club, KAHEA, and Clarence Kukauakahi Ching) requested a contested case hearing on the University’s management plan verbally on April 9, 2009 and in written petition on April 17, 2009. (Ex. B-16)
- 138.On August 28, 2009, the BLNR held a public hearing in Honolulu and voted to deny all requests for a contested case hearing. (Ex. B-16)

C. Current Appellate Review

- 139.On September 28, 2009, the five petitioners appealed the BLNR’s decision to the Third Circuit Court. (Ex. B-16)
- 140.On December 29, 2009, the Third Circuit Court denied the petitioners’ appeal for a contested case hearing because the CMP is an “unimplemented plan.” (Ex. B-16, page 3)

141. On January 29, 2010, the five petitioners appealed the Third Circuit Court's decision to the Intermediate Court of Appeals. (Ex. B-42)
142. On March 25, 2010, at a public hearing of the Board, OCCL recommended and the Board voted to approve the four subplans. (Ex. B-42)
143. On March 30, 2010, Mauna Kea Anaina Hou, Royal Order of Kamehameha I, Sierra Club, KAHEA, and Clarence Kukauakahi Ching timely filed petitions for contested case hearings on the four subplans. (Ex. B-42)
144. On November 9, 2011, the Intermediate Court of Appeals held oral arguments on the petitioners' appeal. (See, http://www.courts.state.hi.us/courts/oral_arguments/archive/oaica30397.html, *accessed on November 13, 2011*)
145. At the oral arguments before the Intermediate Court of Appeals, counsel for the University conceded that the CMP "do[es] not take action". (See, http://www.courts.state.hi.us/courts/oral_arguments/archive/oaica30397.html, *accessed on November 13, 2011 at minute 43:29*)
146. University counsel said: the "management plan itself demonstrates these are management measures that the University has been doing for quite some time and can do." (See, http://www.courts.state.hi.us/courts/oral_arguments/archive/oaica30397.html, *accessed on November 13, 2011, at minute 41:46*)

FINDINGS OF FACT

I. THE CONSERVATION DISTRICT OF MAUNA KEA

147. Mauna Kea is the highest insular volcano in the world. It is home to numerous unique geologic features and a truly awe inspiring natural environment. Revered by Hawaiians for centuries, Mauna Kea still evokes feelings of spirituality from its visitors through majestic views and a landscape that reflect the volcanic history of our planet." (Ex. A-301 CMP, p. 5-24.)
148. Areas in which natural resource conservation is a recognized concern on Mauna Kea encompass at least 106,000 acres (11,308 acres of UH managed lands, 3,894

acres of NAR, 52,500 Mauna Kea Forest Reserve, and 38,300 acres of the Hakalau Refuge). A-302, NRMP, 1-11, 1-12.

149. Extending into a portion of the Mauna Kea Science Reserve is the Mauna Kea Ice Age Natural Area Reserve, between 10,400 and 13,200 feet elevation. The NAR designation was approved by the BLNR on November 9, 1978, a CDUA for the area was approved in 1981, and the executive order establishing the reserve was signed in that year. A-304, Public Access subplan, 2-2.

A. Natural Resources

WATER RESOURCES

150. “In the summit region, annual precipitation ranges from approximately 20 inches at the Very Long Baseline Array (VLBA) at an altitude of 12,600 feet to approximately 15.5 inches (including snowfall) at the Subaru Observatory at an altitude of 13,575 feet. Storms, including wintertime cold-fronts, upper-level and surface low-pressure systems, tropical depressions, and hurricanes provide the majority of annual precipitation over a very short period of time.” (Ex A-308 FEIS Vol. 1, 3-183)
151. Significant snowfall is known to occur during any month of the year, but is concentrated during January through March. (Ex A-308 FEIS Vol. 1, 3-183)
152. Buried ground ice in two of the summit cinder cones show that permafrost exists near the summit. (Ex A-21 2000 Master Plan, p. IV-1)
153. The regional aquifer beneath the summit of Mauna Kea is entirely fresh water. Ex A-308 FEIS Section 3.7 Water Resources and Wastewater p 3-115
154. The Applicant’s evidence indicates that, except for Lake Waiau, which has an impermeable layer beneath it, rainwater and snowmelt at the summit “continues its downward migration to the regional aquifer” of Hawaii Island. Ex A-308 FEIS Section 3.7 Water Resources and Wastewater p 3-115
155. In addition, as evidenced by most seeps and springs, shallow groundwater does exist in the mountains flanks below the summit area. Ex A-308 FEIS Section 3.7 Water Resources and Wastewater p 3-117

156. The Applicant's evidence indicates that drainage at the summit occurs through percolation of rainfall through cinder and broken rock substrates. Ex A-308 FEIS Section 3.7 Water Resources and Wastewater p 3-117
157. Applicant's analysis of spring water shows it to be recent and identical to rainfall at the summit. Ex A-308 FEIS Section 3.7 Water Resources and Wastewater p 3-117
158. Applicant's analysis concludes that at least some of the water percolates downward to ultimately discharge as a spring or seep. Ex A-308 FEIS Section 3.7 Water Resources and Wastewater p 3-117
159. The Applicant's evidence also indicates that surface runoff at the summit does not extend below an elevation of 6,000 feet, which means that "the majority of the water ultimately ends up percolating and **becoming groundwater recharge** with only a small amount lost to evaporation." Ex A-308 FEIS section 3.16 Cumulative Impacts p 3-219
160. Four components of the hydrology of the Mauna Kea summit region remain unknown: 1) watershed calculations of snow-water distribution, 2) outcomes of leachate and liquid waste from septic and cesspool systems, 3) distribution and impacts of permafrost, and 4) groundwater maps of water levels, flow paths, and recharge rates. Ex A-302 CMP NRMP, p. 2.1-39.
161. Groundwater transportation rates at the summit region of Mauna Kea are unknown, and no flow paths have been identified. Ex A-301 CMP, p. 5-31.
162. The 300 feet wide, approximately 10 foot deep, alpine lake, Wai'au, is "unique and revered." Ex A-21 2000 Master Plan, p. IV-2.
163. The southern rim of Lake Wai'au is the rim of a subglacially-formed cinder cone, Pu'u Wai'au. A-308 FEIS, Vol. 1, p. 3-115.
164. At an elevation of 13,020 Lake Wai'au is one of the highest lakes in the United States. It is 300 feet in diameter and believed to have formed 15,000 years ago after the last glacial retreat. Ex A-308 FEIS, Vol. 1, p. 3-115.
165. Lake Wai'au is recharged by precipitation and snow melt. An impermeable layer within Pu'u Wai'au creates a "perched aquifer" that constitutes Lake Wai'au. Ex A-308 FEIS, Vol. 1, p. 3-115.

166. Beneath the summit is a “high level” aquifer, which indicates that it is entirely comprised of fresh-water, as opposed to those that also contain salt water. Ex A-308 FEIS, Vol. 1, p. 3-115.
167. Rainfall and other runoff at the summit percolates into the ground. Ex A-308 FEIS, Vol. 1, p. 3-117.
168. A series of springs lead occur on the southern slopes of Mauna Kea above 11,000 feet and contribute to Pōhakuloa Gulch. Maly 2005, p. 257.
169. These springs are fed by Ka-wai-hū-a-Kāne and lie in the vicinity of Houpo-a-Kāne, the sacred region of Mauna Kea (between the 10,000-11,000 foot elevation. Maly 2005, p. 154, n. 22.
170. Lake Waiau, the highest lake in the Pacific basin, located in the Mauna Kea Ice Age Natural Area Reserve, is approximately 240 feet in diameter and 8 feet deep. In addition to its significance as a geological feature, it is regarded by Hawaiians as a scared place with a rich cultural link to the past. (Ex. A21, p. IV-2)

NATIONAL NATURAL LANDMARK

171. “Rising nearly 33,000 feet from the ocean floor, with a peak elevation of 13,796 feet, Mauna Kea is the highest point in the Pacific Basin and the highest island mountain in the world. Ex A-301 CMP Appendix 4, p. 9.
172. Mauna Kea was listed as a National Natural Landmark in 1972. One of the reasons given for placing the mountain on this register by the National Park Service is that Mauna Kea is the “Most majestic expression of shield volcanism in the Hawaiian Archipelago, if not the world.” Ex A-301 CMP Appendix 4, p. 9.
173. Since 1972, Mauna Kea has been designated as a National Natural Landmark and listed in the registry of National Natural Landmarks as a result of its singular topography, morphology, and geology. Ex A-308 FEIS, p. 3-106.
174. “Few sites posses [*sic*] better credentials to justify their national significance than does Mauna Kea.” Ex A-308 FEIS, p. 3-106, quoting a Mauna Kea NNL program.

175. Abundant evidence of glacial striae, boulders, polices and grooves shows that an ice cap covered Mauna Kea's summit during the Pleistocene era. Ex A-308 FEIS Vol. 1, p. 3-106 (citing the U.S. National Park Service's description of Mauna Kea National Natural Landmark).
176. "Mauna Kea is currently estimated to be between 600,000 and 1.5 million years old and is considered by the U.S. Geological Survey (USGS) to be an active post-shield volcano. While there has been no recent volcanic activity at Mauna Kea, volcanologists believe that it "is likely to erupt again". Ex A-301 CMP, p. 5-24 – 5-25
177. First and foremost, Mauna Kea is the exposed portion of the highest insular mountain in the United States, rising up over 30,000 feet above its submerged base in the Pacific Ocean. Second, on its slopes is found Lake Waiau, the highest lake in the United States. Third, though located in the tropics, indisputable evidence of glaciations is present above the 11,000 foot level. Lastly, possibly transcending all of these nationally significant qualities, is the fact that Mauna Kea is the most majestic expression of shield volcanism in the Hawaiian Archipelago if not in the world. Rory Westberg, Acting Regional Director, NPS Ex A-309 FEIS Vol II p 4 of 531
178. The objectives of the NNL program are fourfold: to encourage the preservation of sites illustrating the geological and ecological character of the United States; to enhance the scientific and educational value of the sites thus preserved; to strengthen public appreciation of natural history; to foster a greater concern for the conservation of the nation's natural heritage. Laura Thielen, Chair, DLNR Ex A-309 FEIS Vol II p 19 of 531
179. Though located in the tropic, indisputable evidence of glaciation is present above the 11,000 foot level. Lastly, possibly transcending all of these nationally significant qualities is the fact that Mauna Kea is the most majestic expression of shield volcanism in the Hawaiian Archipelago if not in the world. Ex. A-309 (TMT EIS Vol. II), p.3-6
180. The Mauna Kea National Natural Landmark is held in trust by the State of Hawai'i, and its 83,900 acre boundary incorporates the lands within the conservation district, including the Mauna Kea Science Reserve, Ice Age Natural Area Reserve and the Mauna Kea Forest Reserve. Ex. A-309 (TMT EIS Vol. II), p.3-6

181. Other unique geologic features of Mauna Kea include numerous cinder cones (*pu‘u*) that rise above lavas of the upper plateau, and evidence of glaciers that covered nearly 27-square miles of the summit region during the Pleistocene Epoch (Ice Ages) approximately 18,000 years before present.” Ex A-301 CMP Appendix 4, p. 9.
182. “Because of its elevation, Maunakea’s summit was repeatedly glaciated during the past few hundred thousand years, and preserves the best glacial record of any oceanic volcano on Earth.” Ex A-308 FEIS, p. 3-105.
183. Hawaiian Hotspot’ magmas, pushed up through the oceanic crust, began building Mauna Kea approximately 750,000 years ago. Throughout its building stages, a‘a and pahoehoe lavas flowed from three main rift zones, forming a volcano resembling a warrior’s shield. Towards the end of the post-shield stage eruptions became more explosive, discharging magma referred to as tephra. These eruptions created the numerous cinder cones dotted across the highest elevations of Mauna Kea. Ex A-301 CMP Appendix 4, p. 9.
184. “Three cinder cones (*pu‘u*) make up the summit of Mauna Kea (Pu‘u Hau‘oki, Pu‘u Wēkiu, Pu‘u Haukea), collectively referred to as Pu‘u o Kūkahau‘ula, a traditional deity associated with fisherman families. There are additional cinder cones (e.g., Pu‘u Keonehehe‘e, Pu‘u Makanaka, Pu‘u Poepoe, Pu‘u Poli‘ahu, Māhoe, and Pu‘u Waiau) below the summit.” Ex A-301 CMP Appendix 4, p. 9.
185. Mauna Kea has two series of volcanic rocks. The older Hamakua series, mostly composed of olivine basalts, forms the bulk of the mountain. The Laupahoehoe series consists of “hawaiites” and comprises a veneer that overlays the upper part of the mountain. Ex A-21 2000 Master Plan, p. IV-1.
186. Subglacial volcanic eruptions gave rise to lava flows that cooled quickly, yielding a fine grained, dense black rock called obsidian, prized by Hawaiians for adzes, at a site known as Keanakako‘i. Ex A-21 2000 Master Plan, p. IV-2.
187. Due to glaciation during the last ice age of the Pleistocene era, ice covered approximately 27 square miles of the summit and ranged in thickness from 200-350 feet, to elevations of 10,500 feet, where ash and cinder were scraped away by glacial flow erosion. (Ex. A21, p. IV-1)
188. Glacial moraine and meltwater deposits of fine sediments, and glacially sculpted features of cinder cones are evidence of summit glaciation that led to the

formation of Lake Waiau, one of the highest lakes in the United States. (Ex. A21, IV-2)

189. The proposed TMT location is entirely underlain by a single lava flow. A single chemical analysis of this lava flow shows the flow to be of typical “hawaiite” composition (a type of alkali-rich basalt). Ex A- 308 FEIS, Vol. 1 p. 108.

AEOLIAN ECOSYSTEMS

190. “The summit of Mauna Kea (12,800 to 13,796 ft) is considered an Alpine Stone Desert. Several species of mosses and lichens, an unknown number of species of algae, some vascular plants constitute the plant community in this region. “Most of the species of plants found in the region are endemic (occurring only in Hawai‘i) or indigenous (native to Hawai‘i but occurring elsewhere). A few non-native plant species have also become established here, even at the summit.” Ex A-301 CMP, p. 5-37- 5-38.
191. During the Pleistocene era, an ice cap covered approximately 27 square miles of the upper regions of Mauna Kea and “scour[ed]” the area it covered. Ex A-21 2000 Master Plan, p. IV-1.
192. Classic terminal, polished rock outcrops, and glacial till deposits resulted from glacial-scouring. These features, combined with snowfall and wind patterns of the summit area, “support various forms of plant and animal life.” Ex A-21 2000 Master Plan, p. IV-1 and IV-2.
193. “The landscape that exists today [on Mauna Kea] was formed by volcanic and glacial activity and is a unique environment for insects, spiders, lichens, ferns, and mosses. Rocky outcrops, loose cinder, and smooth lava flows make up habitats that combine with snowfall and wind patterns of the summit area to support various forms of plant and animal life.” Ex A-21 2000 MP p. IV-1.
194. “The Maunakea summit area is well above the atmospheric temperature inversions that occur around 7,000-feet. Particulates and aerosols like vog (volcanic gas), smog, dust, smoke, salt particles, and water vapors generated below the inversion level are “capped” by the temperature inversion, so they do not rise above the inversion level and do not cause any interference at the summit.” Ex A-308 FEIS, p. 3-182.

195. High winds are common at the summit, but wind velocities usually range from 10 to 30 miles per hour. Wind speeds can exceed 100 miles per hour. Ex A-308 FEIS Vol. 1, p. 3-183.
196. Anabatic winds occasionally penetrate the inversion layer, bringing insects and small volumes of air from lower elevations. Ex A-308 FEIS Vol. 1, p. 3-183 to 3-184.
197. Winds gust up to 100 miles per hour in the upper regions of Mauna Kea, creating an aeolian (influenced by wind) ecosystem. Ex A-308 FEIS Vol. 1, p. 3-183
198. High winds can spread dust to surrounding habitat. (Ex. A-309b, FEIS, Appendix K, p. 31)
199. “Wind vectors (direction and speed) across the summit area play a large role in the aeolian environment, transporting small debris including bugs from lower elevations up to the summit area. Obstructions to wind flow such as at the crests of the pu‘u can redirect the wind or slow it, creating eddies or small vortices that reduce the energy, or holding capacity, of the wind, allowing debris in the air parcel to fall out. The aeolian environment of the summit area is unique, the persistent wind forcing resident fauna to adapt (see Section 2.2.2.2).” Ex A-302 CMP NRMP, p. 2.1-43.
200. Winter temperatures in the upper regions of Mauna Kea range from 10-40 degrees Fahrenheit. Summer temperatures range approximately between 30 to 60 degrees. Ex A-308 FEIS Vol. 1, p. 3-183.

FLORA

201. “Seemingly barren, desolate, and unchanging, the natural environment of the upper slopes and summit area are actually very much alive, revealing through its topography, geology, and climate an impressive history of geomorphic process and ecosystem development.” Ex A-301 CMP, p. 5-24.
202. Although it may appear barren to the casual observer, the summit of Mauna Kea supports an interesting variety of species, many of which are found nowhere else in the world. Ex A-301 CMP, p. 5-38.

203. UH Management Areas on Mauna Kea contain two ecosystems: the Alpine Stone Desert above 12,800 feet and the Alpine Shrublands and Grasslands from roughly 9,500 feet to 12,800 feet. Ex A-308 FEIS Vol. 1, S-4.
204. Vegetation above 12,800 feet in the upper regions of Mauna Kea consists primarily in the lichens, moss, and ferns that have adapted to its severe climatic conditions. FEIS Vol. 1, p. 3-80.
205. An unknown number of algal species and some vascular plants of species found at lower elevations also inhabit the summit region. Ex A-301 CMP, p. 5-37.
206. Native grass species (Hawaiian bentgrass (*Agrostis sanwicensis*) and pili uka (*Trisetum glomeratum*) and fern species ('iwa'iwa (*Asplenium adiatum-nigrum*) and Douglas' bladderfern (*Cystopteris douglasii*) are found at elevations above 12,800 feet as well. Ex A-301 CMP, p. 5-38.
207. The highest density of the 21 known species of lichens in the alpine stone desert region of Mauna Kea grow on north and west faces of rocks, away from direct morning sunlight. Ex A-308 FEIS Vol. 1, p. 3-61.
208. In 1982, 25 lichen species were found on Mauna Kea. Half of those species are endemic to Hawai'i, two of which occur only on Mauna Kea. Ex A-301 2000 Master Plan, p. IV-3.
209. Twelve species of mosses have adapted to the alpine stone desert region and tend to cluster under rock overhangs, where moisture concentrates. Two indigenous species of mosses were detected in a recent botanical survey of the proposed Northern Plateau site for the TMT. Ex A-308 FEIS Vol. 1, p. 3-61.
210. The Mauna Kea Silversword, a sub-species unique to the mountain, was once reported in the summit region. Ex A-301 2000 Master Plan, p. IV-3.
211. Of the 25 different lichens found in 1982, half of the species were endemic to Hawaii, with two occurring only on Mauna Kea. Of the twelve mosses found in the summit area, less than a quarter were endemic. The fern *Cystopteris douglasii* was one of six vascular plants found at the summit, and the Mauna Kea Silversword, a sub-species unique to the mountain, was once reported in the summit region. (Ex. A21, p.IV-2)

212. Botanical community information gaps include: no quantitative botanical studies documenting population size and distribution of native and non-native plant species at Hale Pohaku. No botanical surveys have been conducted along the Summit access Road.
213. Botanical surveys have been limited to species found about 13,000 feet and only in areas considered for future telescope development. Ex A-302 CMP NRMP 2.2-25
214. No information is available regarding the density, distribution, and effects of established invasive plant and animal species at Hale Pohaku and MKSR. Ex A-302 CMP NRMP 2.2-26
215. Recent evidence suggests that there are isolated populations of some endangered and threatened species in the MKSR (Nagata 2007). Ex A-302 CMP NRMP 2.2-25

ARTHROPODS

216. The only resident animal species in the summit area are arthropods. At least ten indigenous Hawaiian arthropod species are residents of this area: wēkiu bugs (*Nysius Wēkiuicola*), lycosid wolf spiders (*Lycosa* sp.), two sheetweb spiders (genus *Erigone*), two mites (Family *Aystidae* and Family *Eupodidae*), two springtails (Family *Entomobryidae*), a centipede of the *Lithobius* species, a noctuid moth (*Agrotis* sp.). Ex A-311 UH/TMT CDUA, p. 3-6.
217. Despite their rarity, critical habitat for arthropod species is unknown or poorly defined because very little is known about their life cycle, population size, fecundity, and area distribution. (Ex. A21, p. XI-22)
218. Little information exists about the habits of arthropod species in the summit area, except the wēkiu bug. Ex A-301CMP, p. 5-39.
219. Wēkiu bugs have adapted to Mauna Kea's aeolian ecosystem; their food supply consists of insects blown from lower elevations towards the summit. Ex A-308 Dust can impact lichens, mosses, and ferns and is believed to degrade Wēkiu bug habitat. Ex. A309b or A35, App. K, p. 31 FEIS Vol. 1, p. 3-70.
220. It has become clear that while Wēkiu bugs can range broadly over the summit when food sources and climate are favorable, the prime habitat is rims and inner

craters of cinder cones. These are ice-free areas that rose above the once surrounding glacier (nunataks), as described by Englund and Porter 2006, sometimes on the flanks and base where cinder has accumulated (Eiben 2010).

- 221. Arthropod and Botanical Inventory and Assessment, by Pacific Analytics, L.L.C., Appendix K FEIS Vol III Ex A-309
- 222. Information on relationships between wind and climate variables and wēkiu bug food availability is lacking. Ex A-302 CMP NRMP, p. 2.1-44.
- 223. In 1982, wēkiu bugs were found in abundance above 13,450 ft and on undisturbed areas on Pu‘u Wēkiu and Pu‘u Ha‘oki and on stable accumulations of loose cinders and tephra rocks with interstitial spaces that allowed the bugs to access moisture and shelter. Ex A-302 CMP NRMP, p. 2.2-34.
- 224. Such hospitable environments for wēkiu bugs are found on cinder cones on the Mauna Kea summit as well as the flanks and bases of cinder cones. Ex A-301 CMP, p. 5-39.

B. Cultural Resources

MAUNA KEA SUMMIT REGION HISTORIC DISTRICT

- 225. In 1999, the Mauna Kea Summit Region Historic District (MKS RHD) was determined eligible for listing on the National Register. (Ex. A-28, FAIS-AP, p. 1-1)
- 226. The MKS RHD includes a concentration of significant historic properties that are linked through their setting, historic use, traditional associations, and ongoing cultural practices. The properties include shrines, adze quarry complexes and workshops, burials, stone markers/memorials, temporary shelters, historic campsites, traditional cultural properties, historic trails, and sites of unknown function. (Ex. A-8, S. Collins WDT, p. 3)
- 227. The proposed TMT project would be located within the Mauna Kea Summit Region Historic District (State Inventory of Historic Place #50-10-23-26869) which was determined by the DLNR - State Historic Preservation Division to be historically and culturally significant under all five criteria (A, B, C, D, & E) of the Hawai‘i Register of Historic Places and Hawai‘i Administrative Rules (§13-275) and under all four criteria (A, B, C, & D) of the National Register of Historic

Places. (Ex. A-37, SHPD letter, p. 1)

228. The five criteria established for evaluating the significance of historic properties and assessing eligibility for placement on the National/Hawai‘i Registers of Historic Places are:

- i. Associated with events that have made an important contribution to the broad patterns of our history;
- B) Associated with the lives of persons important in our past;
- C) Embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, or possesses high artistic value;
- D) Have yielded, or is likely to yield information important for research on prehistory or history;
- E) Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property, or due to associations with traditional beliefs, events or oral history accounts – these associations being important to the group’s history and cultural identity. (Ex. A-309b, FEIS, p. G-54)

229. The MKSRHD is significant under all four National Register criteria, and criterion “e” of the Hawaii Administrative Rules, Chapter §13-275-6. The district is significant under criterion “a” because of the presence of the Mauna Kea Adze Quarry Complex (a National Historic Landmark), which was used over a period of 500 years or more and the hundreds of shrines in and outside of the quarry. Both the quarry and the shrines are associated with broad patterns and events in Hawaiian prehistory. The district is significant under criterion “b” because of the association with several gods who may have been deified ancestors. These include Kukahau‘ula, Lilinoe and Waiau. The sites in the adze quarry and many of the shrines embody distinctive characteristics of traditional Hawaiian stone tool manufacture by craft specialists and a distinctive type of shrine construction found in only a few other places in the Hawaiian Islands. These make the district significant under criterion “c.” Studies of the Mauna Kea Adze Quarry Complex and the on-going archaeological survey of the Mauna Kea Science Reserve have already made a significant contribution to our understanding of Hawaiian prehistory and history, and hold the potential to make even more contributions. The district is thus significant under criterion “d.” Finally, the district is significant under criterion “e” because of the presence of numerous burials and the hundreds of shrines which have been interpreted as evidence of a previously unknown land use practice in the form of pilgrimages to the summit of Mauna

- Kea to worship the gods and goddesses. (Ex. A-309b, FEIS, p. G-54)
230. SHPD has begun working on the nomination of the MKSRHD to the National Register of Historic Places. (Ex. A-28, FAIS-AP, p. 7-1)
231. SHPD has repeatedly stated that they consider the summit region to be a historic district in a number of letters regarding astronomy and astronomy-related projects (See, Don Hibbard letter to Dierdre Mamiya, April 24, 2002; Don Hibbard letter to Robert McLaren, January 10, 2001; Timothy Johns letter to Kenneth Kumor, October 26, 2000; Don Hibbard letter to Robert A. McLaren, May 3, 1999). (Ex. A-309a, TMT FEIS, p. 27)
232. With the recognition of the MKSRHD as eligible for the National Register there is now a single frame of reference that can be used in evaluating site significance for all of the historic properties on the top of Mauna Kea. (Ex. A-28, FAIS-AP, p. 7-2)
233. Per the Mauna Kea Historic Preservation Plan [2000] prepared by SHPD: Within the [Mauna Kea Summit Region] historic district, the significance of properties is not evaluated individually because the summit region as a whole is considered eligible for inclusion in the National Register. Instead, the required assessments consider how each newly or previously recorded property potentially affected by a project contributes to the significance of the historic district as a whole. (Ex. A-309b, TMT FEIS, p. G-55)
234. Pu‘u Kukahau‘ula State Historic Property (SIHP Site No. 50-10-23-21438) is a contributing component of the Mauna Kea Summit Region Historic District. (Ex. A-309b, TMT FEIS, p. G-55)
235. Prior to the historic period, there are no other known sites on the series of cinder cones, including Pu‘u Kukahau‘ula, that comprise the ‘summit’ of Mauna Kea with the single exception of a cairn (Site 50-10-23-21209). There is a virtual absence of archaeological sites on the very top of the mountain. (Ex. A-28, FAIS-AP, p. 6-4)
236. The following environmental zones associated with Mauna Kea are: Ke Kuahiwi- the mountain summit, Ke kualono- below the kuahiwi, the place of silence, or of hearing, Ke kuamauna - the mountaintop, Ke ku(a)hea- the region of mists ; the area of stunted trees, and ke kaolo- the region of paths and trails. DLNR/OCCL staff report Feb 25, 2011, p.3 Kepa Maly 1997

237. In the times of the ancestors, individuals such as *kahuna kuhikuhi pu'uone* were consulted prior to constructing structures so as not to create a physical and/or spiritual disturbance, disconnection, or imbalance between man and his *akua*, and between man and his environment. As such, Kanaka Maoli, including the great *ali'i* (chiefly) dynasties of the past, never built any *heiau* (temples) or large structures on the very summit because of it being *kapu* (sacred). (Ex. G-1, E. Flores WDT, p. 2)
238. The process of consultation with those recognized as the ancestral *akua* and *kupua* of Mauna a Wākea was not done by the Applicant and was also never done by any previous projects. Mo'oinanea has affirmed that they did not get permission from the ancestral *akua* and *kupua* to build on their home. (Ex. G-1, E. Flores WDT, p. 2, 7)
239. Consideration of the properties included within the MKSRHD, and their associated practices and beliefs, suggests it to represent a type of historic property best referred to as a “**cultural landscape**”. A cultural landscape is a geographical definable area that clearly reflects patterns of occupation and land use over a long time period, as well as the cultural values and attitudes which guide and regulate human interaction with the physical environment. [Emphasis in bold] (Ex. A-21, App. N, p. 45)
240. This “cultural landscape” has been determined eligible for the National and State Register of Historic Places under multiple criteria including cultural significance to the native Hawaiian People (cf. letter of D. Hibbard to R. Evans, September 12, 1991). As a result, archaeologists with DLNR-SHPD have referred the summit region of Mauna Kea as a “**ritual landscape**” with all of the individual parts contributing to the integrity of the whole summit region. [Emphasis in bold] (Ex. A-21, App. I, p. 3)
241. Based on the Native Hawaiian traditional cultural practices and beliefs associated with Mauna Kea, as documented in the Maly (1999) oral history and consultation study, the MKSRHD could perhaps even more appropriately be considered a special type of cultural landscape referred to by the National Park Service as ethnographic landscapes: “those landscapes imbued with such intangible meanings that they continue to be deemed significant or even sacred by contemporary people who have continuous ties to the site or area”. (Ex. A-21,

App. N, p. 45)

242. Such an ethnographic landscape would seem to be embodied in the concept of “cultural attachment” use by Maly (1999:27) to describe the connection of many Native Hawaiians to Mauna Kea. (Ex. A-21, App. N, p. 45)
243. “*Cultural Attachment*” embodies the tangible and intangible values of a culture. It is how a people identify with and personify the environment (both natural and manmade) around them. Cultural attachment is demonstrated in the intimate relationship (developed over generations of experiences) that a people of a particular culture share with their landscape--for example, the geographic feature, the natural phenomena and resources, and traditional sites, etc., that make up their surroundings. This attachment to environment bears direct relationship to their beliefs, practices, cultural evolution, and identity of a people. In Hawai`i, cultural attachment is manifest in the very core of Hawaiian spirituality and attachment to landscape. The creative forces of nature which gave birth to the islands (e.g., Hawai`i), the mountains (e.g. Mauna Kea) and all forms of nature, also gave birth to *na kanaka* (the people), thus in Hawaiian tradition, island and human kind share the same genealogy...” (Ex. A-21, App. I, p. 27)
244. OMKM retained Pacific Consulting Services, Inc. [PCSI] to conduct archaeological inventory surveys on Mauna Kea, primarily the Mauna Kea Science Reserve [MKSR], secondarily the Hale Pohaku area, and the access road portion. (S. Collins, Tr. Aug. 17, 2011, p.13:24-25, 14:1-5)
245. According to S. Collins, senior archaeologist for PCSI, “...**survey work was not conducted in support of the TMT**. We conducted the survey work as survey work, so any reassessments we made of that site was based on our work and **not based on TMT**.” [Emphasis in bold] (S. Collins, Tr. Aug. 17, 2011, p.39:16-20)
246. Figure 3.7 of this archaeological inventory survey identified the locations of historic properties, traditional cultural properties, and find spots in the MKSR. (Ex. A-28, FAIS-AP, p. 3-12)
247. The amount of data obtained in the surveys was overwhelming when compared to most archaeological surveys in Hawai`i. This has limited the data analyses that could be undertaken to the shrines and selected artifact assemblages from the Pohakuloa Gulch quarry-workshop site complex. Also, due to the large number of artifacts, the number of analyzed attributes is also limited in number. (Ex. A-133,

DAIS-MKSR, p. i)

248. The largest concentration of historic properties and cultural resources is on the northern slope of Mauna Kea below the summit cones. (Ex. A-28, FAIS-AP, p. 6-1)
249. Many of these sites are located within a narrow 220-ft contour interval, between the 12,900-ft and 13,100-ft elevations on the northern slope. (Ex. A-28, FAIS-AP, p. 6-1)
250. A total of 263 historic properties were identified in the archaeological survey of the MKSR. (Ex. A-133, DAIS-MKSR, p. i)
251. The 260-some historic properties identified, evaluated, and tabulated in surveys for OMKM are considered to be contributing factors to the MKSRHD. (S. Collins, Tr. Aug. 17, 2011, p.60:4-7)
252. A total of 141, or 54%, of these historic properties were classified as shrines by PCSI. (Ex. A-311, CDUA, p. C-3)
253. The term ‘shrine’ is used by Archaeologist [McCoy] to describe all of the religious structures that exist in the summit region of Mauna Kea. (Ex. A-21, App. N, p. 21)
254. Most of the shrines found on Mauna Kea have 1 to 3 uprights. However, some have as many as 24 or 25 stone uprights. (Ex. A-21, App. N, p. 21)
255. Shrines were placed in prominent location with commanding views of the landscape. (Ex. A-21, App. N, p. 21)
256. There are 29 historic properties with a total of 48 features recorded in the MKSR that are interpreted as *Burials or Possible Burials*. (Ex. A-133, DAIS-MKSR, p. 5-44 & 5-45)
257. Although there are known burials in the MKSR, a burial treatment plan has not been prepared even though it has been recommended in PSCI’s survey report. (S. Collins, Tr. Aug. 17, 2011, p. 45:11-18)
258. PSCI’s recommendation as part of the Cultural Resources Management Plan (CRMP): Section 4.3.2: In view of the documented existence of human burials in the Science Reserve there is a need to develop a burial treatment plan (BTP) to

- protect all known burial sites. Given the possibility that more human remains will be found inadvertently in the Science Reserve in the future there is also a need to develop an Inadvertent Discovery Plan. (Ex. A-28, FAIS-AP, p. 8-2)
259. Mauna Kea is a burial ground of our highest born and most sacred ancestors. (Ex. F-2, p. 9)
260. The functions of 15 historic properties recorded in the MKSR are listed as *Stone Markers/Memorials*. (Ex. A-133, DAIS-MKSR, p. 5-46 & 5-47)
261. One of the more ambiguous classes of sites are piles or stacks of rocks believed to be markers of some kind or memorials to a person or event. In all but a couple of cases, the actual function is unclear. (Ex. A-133, DAIS-MKSR, p. 5-46)
262. A 1997 SHPD reconnaissance survey began the process of recording what were initially referred to as “locations” but are now being termed “find spots” – a general term referring to man-made remains that are either obviously modern features or features that cannot be classified by archaeologists with any level of confidence as historic sites because of their uncertain age and function. (Ex. A-28, FAIS-AP, p. 3-10)
263. “Find spots” are cultural resources. (Ex. A-28, FAIS-AP, p. 5-20)
264. Cultural resources in the MKSR need to be considered in developing appropriate management strategies. (Ex. A-311, CDUA, p. C-4)
265. A total of 339 cultural resources (“find spots”) were recorded in the MKSR. (Ex. A-133, DAIS-MKSR, p. ii)
266. The functions of the vast majority (over 250) of these find spots recorded in the MKSR are listed as *Markers*. (Ex. A-133, DAIS-MKSR, Appendix E)
267. The functions of over 65 of these find spots recorded in the MKSR are listed as *Unknown*. (Ex. A-133, DAIS-MKSR, Appendix E)
268. Only about 25 of these find spots recorded in the MKSR have been identified as potentially being modern features. (Ex. A-133, DAIS-MKSR, Appendix E)

269. Some of the find spots could not be definitely dated and could possibly be over 50 years in age and would instead be classified as historic properties. (Ex. A-37, SHPD letter, p. 1)
270. It is highly likely that some of these find spots are actually historic properties, but to demonstrate this would require a more detailed analysis of their morphology and location. (Ex. A-133, DAIS-MKSR, p. ii)
271. Some of the find spots appear to be religious sites to archaeologist, S. Collins. (S. Collins, Tr. Aug. 17, 2011, p.57:3-11)
272. Some of the find spots may also be associated with ongoing religious practices, but their function is ambiguous or unclear in most cases to archaeologist, S. Collins. ((Ex. A-8, S. Collins DWT, p. 7)
273. In August 2005, PCSI was contracted by OMKM to undertake an archaeological inventory survey of the Astronomy Precinct, located within the MKSR. (Ex. A-28, FAIS-AP, p. 1-1 & 1-3)
274. The archaeological field survey crew for the Astronomy Precinct and surrounding lands was limited to PSCI co-principal investigators, Patrick McCoy and Dennis Gosser, and staff, Richard Nees and Reid Yamasato. (Ex. A-28, FAIS-AP, p. 1-4)
275. This field survey crew did not include any Native Hawaiian cultural practitioners. (Ex. A-28, FAIS-AP, p. 1-4)
276. The confidence level of archaeologists in assigning functions to many of the sites and component features varies. (Ex. A-28, FAIS-AP, p. 4-4)
277. “No universally accepted definitions of site and feature exist in Hawaiian archaeology, and it is unlikely that any ever will because of the architectural complexities of the archaeological landscape in many areas of the Hawaiian Islands, and the different perspectives that archaeologists hold on how the archaeological landscape should be observed and recorded.” (Ex. A-28, FAIS-AP, p. 4-3)
278. “While sites and features can be easily described in terms of formal attributes, there is in reality no dichotomy between form and function, since function is inferred from form,...” (Ex. A-28, FAIS-AP, p. 4-3, 4-4)

279. Archaeological classifications are not immutable. They may require revision. (Ex. A-28, FAIS-AP, p. 4-3)
280. Regarding the classification of sites, S. Collins stated, “We did re-evaluate at least one or two sites that we thought might be recent ones, and upon further study we determined they were historic in age. It's not hard and fast. ... So as best we can, we try to make these calls and we try not to make them unless we're reasonably certain. (S. Collins, Tr. Aug. 17, 2011, p. 86:7-20)
281. Due to the uncertainty of archaeologists, a number of sites in the MKSR have not been accurately identified and/or their functions are listed as *Unknown*. (Ex. A-133, DAIS-MKSR, Appendix E)

TRADITIONAL CULTURAL PROPERTIES

282. A Traditional Cultural Property [TCP] can be defined generally as one that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. (Ex. A-28, FAIS-AP, p. 5-15 & 5-17)
283. The National Register Bulletin 38 “*Guidelines for Evaluating and Documenting Traditional Cultural Properties*” (Parker and King 1990), provides agencies further guidance for assessing the importance of traditional cultural beliefs or practices (or cultural attachment) while assessing cultural resources and proposed actions that will affect their integrity. (Ex. A21, App. I, p. 27)
284. In defining “*traditional cultural properties*“, the National Register explains: “traditional” in this context refers to those beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice. The traditional cultural significance of a historic property, then, is significance derived from the role the property plays in a communities historically rooted beliefs, customs, and practices. (Ex. A21, App. I, p. 27).
285. The entire mountain region of Mauna Kea from approximately the 6,000 foot elevation to the summit, including the Mauna Kea Science Reserve, was identified in the Cultural Impact Assessment [CIA] Study (1999) as a potential TCP. (Ex. A-41, CIA, p. 39).

286. The CIA identified a number of potential traditional cultural properties within the Mauna Kea Science Reserve Master Plan project area. These are historic properties that are of importance to Native Hawaiians because they possess traditional cultural significance derived from associated cultural practice and beliefs. These historic properties include the following:

- The entire mountain region, from approximately the 6,000 feet elevation (The saddle area) to the summit;
- Pu`u Kukahau`ula--a cinder cone that is the summit peak of Mauna Kea (sometimes also referred to by the modern name of Pu`u Wekiu);
- Pu`u Poliahu--a prominent summit region cone situated west of Pu`u Kukahau`ula;
- Pu`u Lilinoe--a prominent summit region cinder cone situated to the south east of Pu`u Kukahau`ula;
- Waiau--a shallow lake and its adjacent cinder cone situated in the summit region, to the southwest of Kukahau`ula;
- Pu`u Makanaka and Kaupo vicinity--a cluster of two prominent cinder cone situated near the edge of the summit region to the northeast of Pu`u Kukahau`ula;
- Mauna Kea--Umikoa Trail--and foot and horse trail extending between Kuka`iau in Hamakua to immediately south of the summit area;
- Mauna Kea-Humu`ula Trail--a foot and horse trail extending from the Humu`ula sheep station up to the summit area; and
- A number of lesser foot and horse trails--including the Mauna Kea-Laupahoehoe-Waipunalei Kanakaleonui Trail, the Mauna Kea-Makahalau-Kemole Trail, and the Waiau-Waikiki-Pu`u La`au Trail. (Ex. A-21, App. N, p. 39-40)

MAUNA KAPU (SACRED MOUNTAIN)

287. It is known that Mauna Kea has long been regarded by many native Hawaiians as the most sacred place on the island, and it has been, and continues to be used as a place to conduct traditional and customary practices. Cultural and religious practices associated with the mountain include prayer, burial, and other rituals, and construction of small shrines. (Ex. A-304, MKPAP, p 2-24)

288. "And what do you suppose is the mountain of vision?...It is Mauna Kea, the most sacred mountain in all of Polynesia...The entire mountain is a temple, a heiau and the mountain itself is kapu—sacred...the scientists didn't know this when they built their telescope on the mountain's summit. Nor did they ask permission to do so from the caretakers of that sacred place, and the mountain does have kahus.

- Yet we cannot be too hard on the scientist, for they were simply operating from a place of ignorance, a place of theory, and they are just passing through.” (Ancestral wisdom uttered by Hawaiian Shaman, Elder and Teacher, Hale Kealohalani Makua, in the book titled; “The Bowl of Light”, by Hank Wesselman, Ph.D., p. 192)” (Ex. G-2 (B. Pualani Case) WDT, p. 1)
289. The *inoa* (name) of **Mauna a Wakea** literally means, "Mountain of Wakea". This name is also reverberated by the ancestral guardians connected to this sacred mountain. Wakea (Sky Father) is personified in the atmosphere and heavenly realm that envelops Papahānaumoku (Mother Earth). This mountain is also referred to as “Mauna a Kea”, “Mauna Kea”, or just “Wakea”. (Ex. G-1, E. Flores WDT, p. 1)
290. “Mauna Kea is now widely regarded by some as not only a sacred place, but the most important of all of the sacred places on the island of Hawai‘i.” (Ex. A-303 CMP CRMP, p. 4-12)
291. “It is clear that to many Hawaiians, Mauna Kea is more than a mountain; it is the embodiment of the Hawaiian people.” (Ex. A-301 CMP, p. 1-1)
292. Revered by Hawaiians for centuries, Mauna Kea remains a place of significant worship for Hawaiians, as well as non-Hawaiians. (Ex. A-301 CMP, p. 5-24)
293. “Some contemporary Native Hawaiian cultural practitioners continue to view Maunakea as the first-born of the Wākea and Papa union and, thus, revered as a connection to all Native Hawaiian people and gods.” (Ex. A-308, FEIS Vol. 1, p. 3-13)
294. The summit region of Mauna Kea “...is also by any standard of comparison one of the most culturally significant and archaeologically important places in the Hawaiian Islands. A number of Native Hawaiians regard Mauna Kea as the most sacred place on the island and some use the mountain as a place to conduct traditional and customary practices.” (Ex. A-28, FAIS-AP, p. 1-1)
295. The physical prominence of Mauna Kea as well as its stationing nearest to the heavens holds a spiritual significance for the Hawaiian people, a significance that can be expressed in likening the mountain to a sacred alter. (Ex. A-301, CMP, p. 1-3)

296. For some Hawaiians, Mauna Kea is so revered that there is no desire to ascend it, no desire to trespass on what is considered sacred space. Simply viewing the tower, the mountain, from afar, both affirms its presence, and reaffirms the sense of connection with both place and personage. For this reason, many Hawaiians feel that activities on Mauna Kea that lead to visible alterations of the landscape not only have a significant effect on the mountain itself, but also have a damaging effect on everything and everyone that is physically, genealogically, spiritually and culturally tied to Mauna Kea. (Ex. A-301, CMP, p. 1-4)
297. The origins of Maunakea and its central place in Hawaiian genealogy and cultural geography are told in *mele* (poems, chants) and *mo`olelo* (stories and traditions). Native Hawaiian traditions state that ancestral akua (gods and goddesses, deities) reside within the mountain summit area. Several natural features in the summit region are named for, or associated with, Hawaiian akua; these associations indicate the importance of Maunakea as a sacred landscape. Each part of the mountain contributes to the integrity of the overall cultural, historical and spiritual setting. (Ex. A-309, FEIS, p. 3-11)
298. As a result of its prominence, isolation, and extreme environmental conditions Mauna Kea's place in the culture and history of the Hawaiian people is significant. This "cultural significance" extends beyond a physical setting, sites or particular features which have been previously identified in archaeological site studies. Mauna Kea is a prominent feature on the cultural landscape of Hawai'i which has been and continues to be viewed from afar, and to which spiritual and cultural significance is attributed. (Ex. A-21, App. I, p.3)
299. Mauna Kea is an 'ahu, heiau, or a temple of supreme order, and the reason for that is because it was created in the first time of our chant of our creation when akua gave birth to the aina, and codified the laws of aloha in the land. (TR. K. Pisciotto, September 26, 2011, p. 35:13-21)
300. It's not a normal temple. It is a temple made by the heavens for man to learn the ways of the heavens. The ways of the heavens means the way we live in creation and with creation, and live and walk on the earth. (TR. K. Pisciotto, September 26, 2011, p. 36: 1-12)
301. Codified in that landscape are not only the alignments and relationship to the heavens, the constellations and the stars, but also the wisdom of the ages. Even the chants remain in the rocks and stones. (TR. K. Pisciotto, September 26, 2011,

p. 36: 1-12)

302. Native Hawaiian traditions state that ancestral *akua* (gods, goddesses, deities) reside within the mountain summit area. These personages are embodied within the Mauna Kea landscape – they are believed to be physically manifested in the earthly forms as various *pu`u* and as the waters of Waiau. Because these *akua* are connected to the Mauna Kea landscape in Hawaiian genealogies, and because elders and *akua* are revered and looked to for spiritual guidance in Hawaiian cultural, Mauna Kea is considered a sacred place. (Ex. A-23, p. 5-3)
303. “The upper regions of Mauna Kea reside in Wao Akua, the realm of the Akua-Creator. It is also considered the Temple of the Supreme Being and is acknowledged as such in many oral and written histories throughout Polynesia, which pre-date modern science by millennia.” (Ex. F-2, p.1)
304. “It is home of Na Akua (the Divine Deities), Na 'Aumakua (the Divine Ancestors), and the meeting place of Papa (Earth Mother) and Wakea (Sky Father) who are considered the progenitors of the Hawaiian People. Mauna Kea, it is said, is where the Sky and Earth separated to form the Great-Expanse-of-Space and the Heavenly Realms. Mauna Kea in every respect represents the zenith of the Native Hawaiian people's ancestral ties to Creation itself.” (Ex. F-2 p.1)
305. Poli‘ahu, “*ka wahine i ke kapa hau*” (the woman in the mantel of snow), is at times referred to as an *akua wahine*. She is a part of Mauna a Wakea and creates the rain, snow, hail, and sleet on this mountain. She serves as caretaker and guardian for the mountain and grants permission to certain spirits coming to the mountain. Poli‘ahu has two attendants assisting her, Lilinoe and Lihau. She is a part of the landscape features with a highly evolved consciousness. Both oral and written native Hawaiian traditional accounts have documented Poli‘ahu’s connection to Mauna a Wākea. (Ex. G-1, E. Flores WDT, p. 5)
306. Mo‘oinanea, *mo‘o wahine* and guardian of Lake Waiau, is at times referred to as a *kupua*. She was born on the summit of Mauna a Wākea and assumed the responsibility as guardian of Lake Waiau from her mother, Melemele, who was the former guardian of this sacred body of water. Assisting Mo‘oinanea are her two female *mo‘o* attendants, Kīpu‘upu‘u and Kupukupu as well as others, including spirit attendants. Some serve as guards who watch the whole mountain while her attendants watch the lake when she is gone. Mo‘oinanea also serves as counselor to Poliahu and assists with some of her problems. Her genealogy includes both *mo‘o* ancestry as well as human ancestry. Mo‘oinanea is a revered

- and significant figure in both oral and written native Hawaiian traditional accounts that have documented her connection and genealogical ties to Mauna a Wākea. She is able to communicate with individuals who have the cultural sensitivity and ‘gift’ to see, hear, and interact with her. (Ex. G-1, E. Flores WDT, p. 5-6; Ex. G-2, B. Case WDT, p. 3)
307. Kanaka Maoli ancestors knew and had an unwavering connection with the ancestral *akua* that are Poliahu, Kukahau‘ula, Lilinoe, Mo‘oinanea, and Kane. To them, the essence of the mountain truly resided in these spiritual beings. They also believed in the divine *mana* or power that these *akua* possess which is the same *mana* that Mauna Kea houses. (Ex. G-4, H. Rios WDT, p. 1-2)
308. There are a number of guardian forces of nature connected to Mauna a Wakea. In a ceremony conducted by members of the Flores-Case ‘Ohana on the summit on 8 May 2011, a guardian force of nature from the depths of Mauna a Wākea came forth to provide the following insight. He is a guardian who came from the very depths of the mountain, way below the crust of the ocean floor, one who carries the ancient knowledge. He was filled with sadness because of the observatories on her (the mountain’s) shoulders and breasts were causing such desecration. He was aware of her feelings because they are all connected. Other guardians on the mountain have been awakened and are on alert regarding this proposed development. They are all in full communication with the Creator who can see all things through Wakea. He declared that those who are planning to cause further desecration on Mauna a Wākea are "ignorant and lost". In addition, he explicitly stated a message to them, "You are responsible for what you do not know and you will be held responsible." He also mentioned that everyone is accountable for one’s own actions. Furthermore, he emphasized that, "You don’t know what is coming when you do this, you have been warned." He is the one who has the power to shake the earth. (Ex. G-1, E. Flores WDT, p. 5)
309. Mauna a Wakea is where Poli‘ahu and other ancestral *akua*, ‘*aumakua*, and *kupua* connect with Ke Akua (The Creator). It is so high, the point on the top that they put their hands up to connect to the heavens. They wish to have no other observatories on the mountain for if they continue to build, some spirits might have to move off mountain. Other spirits will not come up there because they had to move. (Ex. G-1, E. Flores WDT, p. 7)
310. ‘Mauna Kea is ‘*ka piko o ka moku*,’ which means ‘Mauna Kea is the navel of the island.’ ...When we understand the three *piko* of the human anatomy, we may begin to understand how they manifest in Mauna Kea. Mauna Kea as the fontanel

- requires a pristine environment free of any spiritual obstructions.” (Ex. A-301, CMP, p. i-ii)
311. Sacred mountains such as Mauna a Wakea, due to their geological composition and extreme height, are a *piko* (portal) that allows for the transference of energy from one source to another. This understanding is reflected in the traditional Hawaiian concept of the "triple *piko*" of a person. In essence, the *piko* on the summit of the mountain is comparable to the *piko* located on the tops of one's head at the fontanel. It is this *piko* where energies and life forces flow from Ke Akua (The Creator) and higher dimensions into the Earth in a similar manner that life forces flow into one's body through the *piko* on the head. (Ex. G-1, E. Flores WDT, p. 7-8)
312. Mauna a Wākea anchors a very complex multi-dimensional over-fold, and does so through its very conscious geometric grid, complex frequencies, and unique electromagnetic field. The summit is also an area where vortexes of energy occur. Vortexes distribute energy outward in what is termed electrical vortexes, and inward in what is termed magnetic vortexes. Mauna a Wakea is an inward and outward vortex-portal complex. (Ex. G-1, E. Flores WDT, p. 8)
313. Mauna a Wākea also resonates in harmonic oscillation with Mount Shasta in California, Mount Fuji in Japan, and other specific mountains around the world. Due to these energetic connections between these mountains, impacts upon Mauna a Wākea also impacts other mountains and vice versa. (Ex. G-1, E. Flores WDT, p. 9, Ex. G-9, p. 1)
314. There are countless mountains around the world considered sacred by cultures past and present. These holy mountains are also keystones to indigenous religions that regarded these areas as the abodes of certain gods, goddesses, deities, divine beings, natural forces, and spirits. In addition, pilgrimages to sacred mountains have been taking place for thousands of years. Whether it is Mauna a Wakea, Mount Shasta in California, Mount Fuji in Japan, Mount Teide in the Canary Islands, or Mount Sagarmāthā (Everest) in Nepal, their sacredness has resonated from centuries past. (Ex. G-1, E. Flores WDT, p. 3)
315. Sages and seers from antiquity have repeatedly remarked that the dimension one sees with their physical eyes is not the only dimension of existence. Many other realms exist and within them a variety of beings, spirits, energies and entities. Traditional peoples the world over have spoken of the existence of these presences. Shamanic practitioners communicate with the spirits of animals,

ancestors, and the plant world. Psychics, clairvoyants and mediums are able to communicate with entities from ‘non-visible’ realms. Religious mystics affirm the presence of angels, deities and other heavenly beings. It is certain that something is happening in dimensions other than those perceptible by one’s normal senses of sight, hearing, touch, and smell. These presences seem to be especially concentrated at the power places and sacred sites such as Mauna a Wākea. (Ex. G-1, E. Flores WDT, p. 10-11)

WAI KAPU (SACRED WATER ELEMENTS)

316. The three pu`u, Poli`ahu, Lilinoe and Waiau are named for three sister goddesses who are female forms of water. Poli`ahu is embodied in the snow, Lilinoe in the mist, and Waiau in the lake. (Ex. A-21, App. N, p. 25)
317. The snow, ice, and water elements are divine manifestations of the different deities. We believe it is very important that the deities not be negatively impacted. (Ex. C-1, Pisciotta WDT, p. 8)
318. Lake Waiau is believed to contain pure water associated with the god Kane and was used in healing and worship practices. (Ex. A-21, App. N, p. 20)
319. Lake Waiau is also home to our akua (deities), such as Mo`oinanea, who is recorded in our genealogies and who is assigned to care for the *kupua* children. (Ex C-1, Pisciotta WDT, p. 8)
320. Lake Waiau is a very important cultural and religious site on Mauna Kea. The lake represents many things to the Hawaiian People and to many others as a beautiful, unique and special place. (Ex. C-1, Pisciotta WDT, p. 8)
321. Lake Waiau is considered among other things to be a doorway into the Po (the Heavenly Realms of the Ancestors). It is said this is the water of the sea and the water of the sky meet. (Ex C-1, Pisciotta WDT, p. 8)
322. Lake Waiau is like a navigational gourd to view the heavens in, as the stars are reflected on its surface. (Ex C-1, Pisciotta WDT, p. 8)
323. The snow, ice, and waters of Lake Waiau (or other pooling water areas, like those that occur on Pu`u Pohaku) are very valued because they are gathered for medicinal and other ceremonial uses and purposes. (Ex C-1, Pisciotta WDT, p. 8)

324. Traditional Hawaiian water uses are part of how watershed lands that now are called Conservation Districts are originally established. (Ex C-1, Pisciotta WDT, p. 8)
325. Our traditions tell us the waters we swim in at Hilo Bay are from Mauna Kea. The water of Mauna Kea even feed our fish ponds below. (Ex C-1, Pisciotta WDT, p. 8).

NATIVE HAWAIIAN TRADITIONAL, CUSTOMARY AND RELIGIOUS PRACTICES, USES, AND ACCESS

326. Native Hawaiian traditional and customary rights are legally and constitutionally protected. Exh A-313 Staff Report Feb 25, 2011, p.10-11
327. According to Mo‘oinanea, when Hawaiians of old travelled up to the summit, they went by Lake Waiau to leave an offering or left an offering at the bottom of mountain. Offerings were made to Poliahu and Mo‘oinanea. These people would collect snow to see how it was or they used to go up there to get centered. *Kahuna* would also go for their chief to gather water from the lake as an offering for chiefs or places they travel to. She is fine with people putting their *piko* in the lake, but you have to have roots to the mountain. (Ex. G-1, E. Flores WDT, p. 6-7; Ex. G-2, B. Case WDT, p. 3-4)
328. Pu‘u Kukahau‘ula is significant due to its cultural significance to the Hawaiian people, associations with former and on-going cultural practices, and associations with traditional beliefs, events, and oral history accounts. (Ex. A-309b, FEIS, p. G-55)
329. The summit region, which includes the Mauna Kea summit Region Historic District and Kukahau‘ula is a sacred area in Hawaiian culture and serves as a site for individual and group ceremonial and spiritual practices. (Ex. A-308, p 3-26)
330. As a result of his exhaustive studies, Kepa Maly identified many traditional cultural properties on Mauna Kea. He documented ongoing traditional cultural practices associated with several of these. It is a sacred landscape that provides a connection, genealogically, physically, and spiritually to ancestral realms. The mythical creation of Mauna Kea is part of a Hawaiian cosmology that establishes a relationship between all things animate and inanimate. (Ex. A-23, p. 1-2)

331. Mauna Kea is the first-born offspring of Papa Hanau Moku and Wakea who are the progenitors of the Hawaiian people. Exh A-313 Staff Report Feb 25, 2011, p.4-5
332. Mauna Kea is a guiding and connecting point for many Native Hawaiians. (Neves, Tr. August 25, 2011, p. 108:4-5)
333. There's a practice that the chiefs of the Order of Kamehameha do. The Royal Order Processional to ascend Mauna Kea. It begins often at my house at 9 or 10 o'clock p.m. where all that are participating gather for protocol instructions and then we give *ho`okupu* (offerings on the *lele*--ceremonial platform, in my yard) and start the procession up Mauna Kea. Many people join in these ceremonies--the last one we had over 75 people and they often come from all walks of life and all places around the world also. Ex. F-3, *National Geographic*; Ex. F-1, Neves, WDT, p. 2
334. We *hi`uwai*, this is to cleanse; before you set out on coming into the presence of the supreme beings, you need to cleanse yourself, to get all things out of your mind. So we do *hi`uwai* there if it's necessary... We do this four times a year, on both equinox and solstice. But we also do that when we feel the need, when we feel the people or ourselves needing to be in the presence. We also stop at Puhi Bay *ahu* (shrine), made maybe 20 years ago. (Ex. F-1, Neves, WDT, p. 2)
335. The second thing we do is go to the Naha stone (The Stone Kamehameha I lifted to prove his right to lead the people). The Naha is on Waianuenue Avenue at the Hilo Public Library in Hilo, and there we pray for what we call *ke alaka`ina*, for the leadership, for us leaders to continue, for those who have put themselves in positions of leadership, to be *pono*. And so we reflect on Kamehameha's life and his commands to us as chiefs. (Ex. F-1, Neves, WDT, p. 2)
336. From the Naha we go to the *ahu* at Pu`uhuluhulu, at the junction of the road to Mauna Kea. There we honor our *kupuna*, our grandparents, our tutus, both the living those that cannot make the journey because of restrictions of their health, and those that have made the journey and yet have never been to the top of the mountain. Those who are in the spirit, so we honor our *kupuna*. And we ask them to always give us counsel, to speak to us. We built this *ahu* for those that could not ascend further. (Ex. F-1, Neves, WDT, p. 2)
337. From there we go to Hale Pohaku, to the *lele* there (which is behind the gate at the MK VIS). It's a *lele* that we put together some years back. Because at that level,

- we pray for clarity of mind and purpose. We ask to chiefs for permission to ascend. All of Mauna Kea is an *ahu*, so we ask for clarity and humility. We may stop at Kealoha's 'Ohana place, too to ask to ascend even further. (Ex. F-1, Neves, WDT, p. 2)
338. At the top, Kukahau`ula, we do not ask for anything. What will be given, is given. It is there we welcome the morning sun or we welcome the sun going into the sunset. But we pray there, we pray for aloha, for peace, for goodness for all. Then we receive whatever they want to give us. (Ex. F-1, Neves, WDT, p. 2)
339. Members of the Flores-Case 'Ohana have conducted ceremonies on Mauna a Wakea in concert with ancestral traditions of having a reverential relationship with the living Earth. The cultural perspective of *aloha 'āina*, to have sincere love and respect for the land and nature, is at the heart of Hawaiian traditions. (Ex. G-1, E. Flores WDT, p. 5, 12)
340. Over the years, B. Pualani Case has strengthened her ties to Manaua, Mo'oinanea, and Mauna a Wākea. As a chanter, hula dancer, Kumu Hula (instructor), and cultural practitioner, she has held many formal ceremonies up on the *pu'u* of Waimea with each ceremony beginning with facing the Mauna and gathering the breath and heartbeat of the mountain within her body. As the sacredness and immensity of it's vibration fills her and each dancer standing by her side, they honor the mountain's beauty and cultural importance with the words of chants such as this one: "*He lei keakea noho maila i ka mauna, Ka mauna ki'eki'e i luna ku kilakila, Kilakila 'o luna, 'o luna i ke ao*" (written by Nona Beamer) In addition, a chant that describes the perspective of "triple *piko*", *E Ho'olōkahi ē*, is often done by them in ceremonies or gatherings, connecting at times with the *piko* on the summit of the mountain. (Ex. G-2, B. Case WDT, p. 4-5; Ex. G-16; Ex. G-17, E Ho'olokahi E Chant)
341. According to cultural practitioner, Case, "No matter where the ceremony, we begin by acknowledging the most significant mountain in the Pacific as did our *kūpuna* of old. We announce who we are by our mountain, our living waters, and our land base. My tie to the mountain and cultural practices are formal and sacred, tied with deep and abiding *Aloha*." (Ex. G-2, B. Case WDT, p. 5; Ex. G-16)
342. According to cultural practitioner, Case, "In ceremonies conducted on the Waimea *pu'u*, on the summit of Mauna Kea and at other parts of the island, I have witnessed the ancestral guardians and divine beings connected to this sacred mountain as they have provided a voice of concern about the existing and

- proposed development activities on this mountain. We have been told that the mountain is alive and can take care of itself. At any time it could clean itself with a mighty shake or a lightning bolt. Mo‘oinanea has acknowledged that we all have free will to refuse but has at the same time asked us to step forward to speak for her and others on the mountain in union that this development is not beneficial for us or our environment. They have asked us to ask the question, ‘Who will be responsible for the consequences not yet known that will affect the mountain and all of us?’” (Ex. G-2, B. Case WDT, p. 5)
343. Case has witnessed a portal opening overhead in the sky above the *piko* of Mauna Kea. In addition, she has seen and experienced other divine occurrences connected with the mountain. (Ex. G-2, B. Case WDT, p. 5; Ex. G-10)
344. Petitioner Ching practices "*pule ho'oulu*" [traveling "on foot, on a system of trails that crossed the mountain," a practice that extended through the mid-1800s according to Maly] and has walked/hiked the trails and non-trails on Mauna Kea. (Ex. E-1, Ching WDT, p 1)
345. Ching complies with and practices the essential elements ("Let every elderly person ... lie by the roadside in safety.") of the Law of the Splintered Paddle (Kanawai Mamalahoe) on Mauna Kea. (Ex. E-1, Ching WDT, p 3)
346. Ching's cultural practices on Mauna Kea are, or are connected to, traditional and cultural practices that pre-date 1892. (Ex. C-11; Ex. A-21, Appx. I; Ex. A-21, Appx. N)
347. The mountain landscape in navigational traditions: Hawaiian Navigational, it is noted that while none of the archival historical literature has made specific references to the sites or features that were recorded as being associated with navigational practices and customs, the gods and deities associated with Mauna Kea have celestial body forms and some were evoked for navigational practices. Ex. A21, App. I, p.29
348. Mauna Kea is actually the fulcrum of such ceremonies, because the Mauna sets the ultimate relationship to all other sacred sites for such ceremonies, as Mauna Kea is the highest point and from there you can see all else. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 5
349. [T]housands of years ago our navigators and star people developed a system that allowed our ancient people to circumnavigate the globe and to people the tiniest

islands scattered across the largest ocean on earth, the Pacific Ocean. We did this before the birth of Christ and at a time when no one on earth was doing a similar method of ocean voyaging...they did develop a system of advanced mathematics that allowed them to understand and determine that the earth was round and to a concept of a celestial equator. If this were not the case they could not have found the tiny little islands across a vast ocean with any accuracy at all. If your measurements are off by only a few degrees you will get lost at sea, because even tiny discrepancies in measurement on the sky translate to hundreds of miles on the ocean. Ex C-1 K. Pisciotto, June 28, 2011, WDT, p. 5

350. I had an astronomer friend query me on this very thing, asking how the Hawaiian people knew the earth was round before the Europeans did?...I finally explained how we did understand these principles (i.e. celestial equator), but that they were contained for example in our stories of Creation and Papa (Earth Mother) and Wakea (Sky Father). His response was surprising to me, in that he was resistant to the idea that any science could flow from mythical stories...I explained that these stories are not myths but rather teaching tools. Our teachings are storied but they also meet the criteria of science, in that they are based on observation and are measurable and repeatable. Our modern Navigator's and their many accomplishments are evidence of this. Our oral traditions are not mere mythical stories, and they are dependent on the landscape and that is why the landscape of Mauna Kea needs to be protected and preserved. Ex C-1 K. Pisciotto, June 28, 2011, WDT, p. 5

351. These ceremonies are about tracking the motion of the sun across the sky throughout the year and were used by our people and most of the ancient people around the world to keep track of the year. The po'e kahiko (ancient Hawaiian people) are not alone in these ceremonies for keeping track of the motions of the celestial bodies and their relationship to the observers on earth. The Celtic Shaman, Egyptian Priests, Mayan Priests, Chinese, Arab and Middle Eastern astronomers and holy people all performed the ceremonies similar to those we perform on Mauna Kea. Ex C-1 K. Pisciotto, June 28, 2011, WDT, 6

352. Tracking the sun is for growing and harvesting. But more important is the need to track the annual time in the context of a much greater time frame known as the precession, which is the 26,000 year cycle (although some used slightly different time frames). Ex C-1 K. Pisciotto, June 28, 2011, WDT, 6

353. This cycle is the measure of the wobble of the earth's axis, and the time it takes for the wobble to make a complete cycle. The wobble was important to keep track

- of because relative to earth the pole stars appear to change over time. If the pole stars change it drastically impacts navigation. If the poles are changing then over time our knowledge must change to reflect these changes or we will get lost, and for us especially that means getting lost at sea. Ex C-1 K. Pisciotta, June 28, 2011, WDT, 5
354. The idea that so many ancient people understood this concept is amazing in and of itself. It would take about 70 years for a single person to realize that such a motion was actually happening and another great leap of consciousness to understand it would take about 26,000 years for the precession cycle to be completed. How the ancient peoples of the world came to this understanding is amazing. I learned about this from my Kupuna first, and then did some of my own research. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 6.
355. The ceremonies I just described are specifically dependent upon our ability to observe and track the motion of the sun and other celestial bodies in order to find our way and to determine when and how to perform certain things for the care of the land and sea. Our traditional resource management models are dependent on these ceremonies. Our ancient knowledge relating to our relationship to our other Pacific people are also a part of this knowledge. And lastly our sacred prophecies are based in this knowledge. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 6
356. But more important is the need to track the annual time in the context of a much greater time frame known as the precession, which is the 26,000 year cycle (although some used slightly different time frames). This cycle is the measure of the wobble of the earth's axis, and the time it takes for the wobble to make a complete cycle. The wobble was important to keep track of because relative to earth the pole stars appear to change over time. If the pole stars change it drastically impacts navigation. If the poles are changing then over time our knowledge must change to reflect these changes or we will get lost, and for us especially that means getting lost at sea. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 5
357. Our traditional resource management models are dependent on these ceremonies. Our ancient knowledge relating to our relationship to our other Pacific peoples are also a part of this knowledge. And lastly our sacred prophecies are based in this knowledge. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 6

358. We refer to the summer solstice ceremonies as "Ke Ala Polohiwa a Kane", Winter as "Ke Ala Polohiwa a Kanaloa, spring equinox as "Ke Ala`ula a Kane", and autumnal equinox as "Ke Ala Ma`awe`ula a Kanaloa":

- Winter Solstice = "Ke Ala Polohiwa a Kanaloa" -- The Black Glistening Path of Kanaloa--is when the sun hits its farthest point south in the sky, occurring in December.
 - The Summer Solstice is "Ke Ala Polohiwa a Kane" --The Black Glistening Path of Kane-- when the sun reaches its most northern point in the sky, occurring in June.
 - Whereas, the equinoxes (where the sun crosses the equator ("Ka Piko o Wakea" from my family tradition) to the far winter and summer points are called:
 - "Ke Ala`ula a Kane " (The Spring Equinox--The Dawning of the Path of Kane") occurring in March and;
 - "Ke Ala Ma'awe`ula a Kanaloa" (The Autumnal Equinox--"The Red Track or Tentacle") of Kanaloa) occurring in September.
- Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 6-7

359. The map of Exhibit C-5 describes traditional cultural view planes. This map incorporates our testimony as well as others. It is not a complete map but it does help provide a visual representation of some of the view planes including some of the solstice and equinox view planes and those in relation to other the sites and also to the other islands. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 7

360. On this viewplane map, you can see that the TMT will be in direct line of sight of Maui and the NW plane which is used for ke ala ao (solstice and equinox) ceremonies. There are also lines that represent the relationship between Mauna Kea and Poli`ahu Heiau on Kaua`i, Ahu a Umi Heiau situated between the three great mountains (Hualalai, Mauna Loa and Mauna Kea) on Hawai`i Island, the Pu`u Kohola Heiau in Kawaihae, Hawai`i Island, and Motu Manamana (Necker Island) of the North Western Hawaiian Island which marks the great turn around of the sun during the ke ala polohiwa time. The shrines on this tiny island are related to this relationship too. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 7,

361. Exhibit C-6 is a picture of the Southern Sky from Mauna Kea. At the left is the glow of the lava from Kilauea volcano. In the sky at the center is the Southern Cross. The Snow covered peak in the center is the true summit of Mauna Kea, the highest point in the Pacific. At the right, the dome of the 8-meter Gemini North Telescope is under construction - found in the Atlas of Hawai`i, 3rd Ed. Edited by

Juvik and Juvik, Chief Cartographer Thomas R. Paradise, at Photograph by Mr. R.J. Wainscoat, copyright 1997, p. 98. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 7,

362. The Summit Access Road was built with government funds and is a public road (“non-exclusive road easement”). Ex. A35, (Mauna Kea Public Access Plan), p. 1-4

CONTINUITY OF HISTORY, USE, PRACTICE AND CULTURAL ATTACHMENT

363. For the purposes of evaluating the significance of Native Hawaiian cultural practices, features and beliefs identified in association with the Science Reserve Master Plan Project Area, it would be useful to consider them in terms of the three types of informant claims that were defined earlier ... information obtained by Maly in his oral history and consultation study (1999) suggests that several of the identified practices and beliefs would appear to fall within the category of traditional and customary practices claims. Ex. A21, App. N, P. 43
364. These would be claims that would lie within the purview of Article XII, Section 7, of the Hawai`i State Constitution (“Traditional and Customary Rights”) particularly as reaffirmed in 1995 by the Hawai`i State Supreme Court in the decision commonly referred to as the “PASH decision”, and further clarified in the 1998 decision in “State v. Hanapi.” Which would include various cultural practices and beliefs associated with the general geographical area of the summit region rather than a clearly definable property or site. Ex. A21, App. N, P. 43
365. While certain other practices, such as prayer and ritual services involving the new construction of new *kuahu* (altars), or the releasing of cremated humans rather than internment on *pu`u*, might seem to be contemporary cultural practices they may as well be considered reasonable cultural development evolving from earlier traditional practices. *Id.*
366. Based on the evaluation of the findings of the present cultural impact assessment study made in reference to (a) the known content of the traditional Hawaiian culture and (b) the National Register Criteria as clarified by the National Register Bulletin No. 38, it is believed that with the exceptions noted above, most of the Native Hawaiian cultural practices, features and beliefs as identified as being currently associated with the Mauna Kea Science Reserve Master Plan Project

area can be considered to be culturally and historically significant. Most if not all of the identified practices and beliefs would seem to qualify as traditional and customary practices within the meaning of the Hawai'i State Constitution, while the principle *pu`u* and the shallow lake with adjacent *pu`u* would seem to satisfy the criteria for being regarded as a legitimate traditional and cultural property. Finally, none of the identified practice and beliefs would seem to represent strictly contemporary cultural practice or beliefs lacking some measure of traditional connection. *Id.* P. 45

C. OVERSIGHT OF UH ACTIVITIES ON MAUNA KEA

GENERAL LEASE

367. The General Lease (S-4191), dated June 21, 1968, states that the university 12.) "shall not damage, remove excavate, disfigure, deface, or destroy and object of antiquity, prehistoric ruin, or monument of historic value." Exhibit B-2, General Lease (S-4191) p5
368. The General Lease (S-4191) requires that 5.) "The lessee shall not sub-lease, subrent, assign or transfer any rights there under without the prior written approval of the BLNR." (Exhibit B-2, General Lease (S-4191) p 4
369. The General Lease (S-4191) states that 2.) "The lessee shall keep the demised premises and improvements in a clean, sanitary, and orderly condition Exhibit B-2 p 3
370. The General Lease (S-4191) states that "improvements shall be such improvements may be abandoned in place.... removed or disposed of by the Lessee at the expiration or sooner termination of the lease, provided, that with the approval of the Chairman requires that items be removed before the lease termination, or be abandoned with prior approval from the BLNR. Ex. B-2, page 4
371. The General Lease (S-4191) states that 1a)"No activity shall be permitted which will result in the pollution of the waters of Lake Waiau" Ex B-2 p2
372. General Lease S-4191 from DLNR to the University for the use of the Mauna Kea Science Reserve does not confer an expectation of exclusivity onto the University. Ex B-2 p4

SUBLEASES, SUBDIVISION, RENT, AND SURETY

373. There are currently 13 subleases for telescope facilities on the land leased to the University in the Mauna Kea conservation district. (Ex. Jt-1/A-301, page 6-1, Nagata, Tr. August 16, 2011, 208:18-22, Ex. B-3, B-4, B-5, B-6, B-7, B-8, B-9, B-10, B-11)
374. All telescope subleases occur within the University-designated “Astronomy Precinct,” except for one antenna that was built before the Astronomy Precinct was established by the University. (A-301, page 3-1, Nagata, Tr. 187:7-25, 188:15-18, Ex. B-3, B-4, B-5, B-6, B-7, B-8, B-9, B-10, B-11)
375. Parties to the subleases are the telescope operator, the University, and DLNR. (Ex. B-7, Attachment A, page 1, Ex. B-3, B-4, B-5, B-6, B-8, B-9, B-10, B-11)
376. The subleases authorize telescope operators to control the premises of the telescope facility. (Ex. B-7, Attachment A; Nagata, Tr. August 16, 2011, 212:12-16)
377. The sublease to the William H. Keck Observatory is an example of the kind of subleases issued for telescope facilities on Mauna Kea. (Ex. B-7, Nagata, Tr. August 16, 2011, 208:2-210:8)
378. The terms of the sublease to the William H. Keck Observatory provide for:
- the “sole responsibilities of Caltech and/or UC” (Ex. B-7, page 5)
 - facilities “within the border of the Demised Premises” (Ex. B-7, page 2)
 - survey of the demised premises (Ex. B-7, attachment A, page 2)
 - indemnification of the sublessor on the demised premises
 - peaceful enjoyment of demised premises (Ex. B-7, attachment A, page 4)
 - the construction of telescopes and other buildings (Ex. B-7, attachment A, page 6)
 - the construction of roads
 - a map of “demised premises” (Ex. B-7, “sublease exhibit B,” page 25)
 - ownership of improvements (Ex. B-7, attachment A, page 9)
 - right of entry (Ex. B-7, attachment A, page 5)
379. The “Operating and Site Development Agreement,” to which the sublease for the Keck Observatory is attached, defines “demised premises” as “the land subleased to Caltech by UH with the approval of the BLNR. The Demised Premises are a **portion** of that certain land area leased to UH by BLNR and described in General Lease S-4191”. (Ex. B-7, page 2. *See also*, attachment A to Ex B-7, page 2)

380. The sublease states that:

- A. “Sublessor, in consideration of the rent hereinafter reserved and upon the conditions, covenants and agreements hereinafter expressed, does hereby demise and let to sublessee the parcel of land described in Exhibit C, attached here to and incorporated herein by reference, and sublessee does hereby sublease from sublessor said parcel for the purpose of erecting a telescope facility”. (Ex. B-7, Attachment A, p 1)

381. The sublease further states that:

- A. “[c]onstruction will include the W.M. Keck Observatory building and dome, its optical/infrared telescope having an effective diameter of approximately 10 meters, related equipment and instrumentation, and related support facilities and infrastructure improvements required on the demised premises to support the operations of the Observatory (collectively “Facilities”). (Ex. B-7, Attachment A, p 1)

382. The sublease further states that:

- A. “[s]ublessee contemplates the possible construction of a second observatory building, dome, and telescope (hereinafter “second facility”) on the demised premises”. (Ex. B-7, Attachment A, p 1)

383. The sublease further states that:

- A. “[s]ublessee shall peaceably hold and enjoy the demised premises during the term hereof without hindrance or interruption.” (Ex. B-7, Attachment A, p 4)

384. The “Consent to Sublease” from BLNR to the University is signed by Douglas Ing, who was a member of the BLNR at that time. (Ex. B-7, exhibit C, p 24)

385. Douglas Ing is currently an attorney for the TMT Observatory Corporation. (Ing, Tr. May 13, 2011, 4:21-23)

386. HAR 13-5-30(c)(7) states that “subdivision of land will not be utilized to increase the intensity of land uses in the conservation district.”

387. HAR 13-5-2 defines “subdivision” to mean “a division of a parcel of land into more than one parcel.”

388. HAR 13-5 provides no exceptions to this rule.

389. Webster's Merriam Dictionary defines "division" as something that "divides, separates or marks off," as in a "border." (See, <http://www.merriam-webster.com/thesaurus/division>, accessed November 14, 2011)
390. In the course of developing techniques for astronomy, spin-offs occur that are not directly related to a discovery on Mauna Kea. In some cases the spin-offs are patented. Bolte Tr. 8.18.11 p81 8-21
391. Dr Bolte could not provide examples of actual spin-offs derived from astronomy techniques. Patents for ideas which go out into the public domain are not developed by the University of California. They don't generate any funding from them. Bolte Tr. 8.18.11 p84 4-25
392. The University of Hawai'i at Hilo (UH-Hilo) is the Applicant of Conservation District Use Application HA-3568 ("CDUA") - Thirty Meter Telescope. Ex A-311 p1 of Item K-1 (CDUA)
393. The Agent (signatory) for the Applicant UH-Hilo on CDUA HA-3568 is Dr. Donald Straney, Chancellor. Ex A-311 p1 of Item K-1, (CDUA)
394. Dr. Donald Straney is the Chancellor of UH-Hilo. Ex A-311 p.1, K-1, (CDUA)
395. The Applicant, University of Hawai'i at Hilo, is seeking a Conservation District Use Permit (CDUP) relative to CDUA HA-3568 on behalf of TMT Observatory Corporation ("TMT"). Ex A-311 p.13, K-1 (CDUA)
396. The TMT was founded by the California Institute of Technology, the University of California, and the Association of Canadian Universities for Research in Astronomy. Ex A-311 p.13, K-1 (CDUA)
397. California Institute of Technology, the University of California, and the Association of Canadian Universities for Research in Astronomy are they are listed as founders only. Ex A-311 p.13, K-1 (CDUA)
398. There is no definition or description for the following terms: founder, collaborating institution, or observer - and it is therefore impossible to determine what, if any, the distinctions are between the terms, and therefore, between the

parties.

Ex A-311 p.13, K-1 (CDUA)

399. The terms of the TMT sub-lease have not been negotiated. Sanders Tr. 8.15.11, P 82: 12-17
400. Applicant's project manager is not aware of negotiations for a lease extension. Sanders Tr. 8.15.11, P 82: 20-24
401. Applicant's project manager stated that a lease extension may be requested. There currently no plan for when a general lease extension will be requested, or any assurance of lease terms. Sanders Tr. 8.15.11, P 8; 5-24, p 283: 8-9
402. Applicant's project manager could not say what the TMT would pay in rent under the current lease. Sanders Tr. 8.15.11, P 83: 18-20
403. Applicant's project manager could not say what the DLNR meant by "substantial rent". Sanders Tr. 8.15.11, P 83: 21-25
404. Applicant's project manager could not say who the rent would be paid to. Sanders Tr. 8.15.11, P 84: 6-12
405. Applicant's project manager stated that funds to be set aside for decommissioning were estimated at \$1M per year over a 50 year lifetime. Sanders Tr. 8.15.11, P 84: 15-22
406. Applicant's project manager stated that potential partners for the Project include the TMT Observatory Corporation, managed by a board consisting of members from California Institute of Technology, and the University of California, consortium of Canadian universities, Association for Canadian Universities for Research in Astronomy, National Astronomical Observatory of Japan, the National Astronomical Observatory of China, and the Department of Science and Technology of India. Sanders Tr. 8.15.11, p 85: 4-17
407. Applicant's project manager stated that the partners are engaged in discussions about the nature of the agreement, and the legal structure to carry out the project. The business plans will be in place before construction can start. Sanders Tr. 8.15.11, P 101: 13-17

408. Applicant's project manager stated that a permit must be in place before a legal structure and an agreement can be formed. Sanders Tr. 8.15.11, P 101 20-22, p 102: 5-6
409. Applicant's project manager stated that the finances are not in place to complete the project. Discussions are taking place with various funding agencies and respective partners. Sanders Tr. 8.15.11, P 102: 22-25, p 103 1-2
410. Applicant's project manager stated that he is paid by the corporation to carry out the design, execute construction and comply with terms and conditions of the lease and operating agreement. Sanders Tr. 8.15.11, P 103: 21-25
411. Applicant's project manager stated that he is paid \$240,000 a year, and has held his position since 2004. Sanders Tr. 8.15.11, P 106: 4-5, p 108: 3-5
412. OMKM Interim Director stated that neither OMKM nor the CDUA required the TMT to have secured full funding before beginning construction. Nagata Tr. 8.17.11, p 197: 8-11
413. OMKM Interim Director could not say what protections would be in place if the project were partially completed, and if there were no money for completion of the project. Nagata Tr. 8.17.11, p 198: 12 -25
414. The CDUA does not address funding of the project. Nagata Tr. 8.17.11, p 199: 4-5

SCOPE OF THE MAUNA KEA CONSERVATION DISTRICT

415. "Because living things, ecosystem processes, and cultural practices are not usually confined by administrative boundaries, it is important for the NRMP for the UH Management Areas to consider the user activities, management issues and regulations (or lack thereof) on lands adjacent to the focus area." Ex A-302 CMP NRMP, p. 1-11.
416. The 1977 Management Plan for Mauna Kea (see below) identified the scope of the Mauna Kea conservation district as from the summit down to the 6,000-foot elevation and including all lands from the summit to Saddle Road, including the Mauna Kea Forest Reserve and Game Management Area, and Kaohe Game Management Area. (Ex. D-3, page 1)

417. The Mauna Kea Ice Age Natural Area Reserve (NAR) was established in 1981 and is comprised of two parcels that abut the Mauna Kea summit region. One is 143.5 acres and a larger, triangle shaped parcel is 3,750 acres. These areas contain Lake Wai'au and the Mauna Kea Adze Quarry. Ex A-302 CMP NRMP, p. 1-12.
418. The approximately 52,500 acre Mauna Kea Forest Reserve surrounds the UH managed areas and the NAR, and contains critical māmane habitat for the endangered Palila bird. Ex A-302 CMP NRMP, p. 1-12.
419. The Hakalau Forest National Wildlife Refuge encompass 33,000 acre Hakalau forest Unit and the 5,300 acre Kona Forest Unit. Ex A-302 CMP NRMP, p. 1-12.
420. Pōhakuloa Training Area (PTA) lands total 108,863 acres that extend up the lower slopes of Mauna Kea to an approximate altitude of 6,800 ft. PTA contains critical Palila bird habitat, fifteen federally listed threatened and endangered plants, three federally listed endangered bird species, and one federally listed bat species. Ex A-302 CMP NRMP, p. 1-12.

MAUNA KEA PLAN, MAY 1977

421. In 1974, George Ariyoshi expressed concerns that “social pressures for more intensive use of Mauna Kea for scientific, recreational, and other purposes pose a threat to the priceless qualities of that mountain...” He wrote to Sunao Kido, then Chairman of the DLNR, directing that the agency “develop and promulgate, as expeditiously as possible, a Master Plan for all of Mauna Kea above the Saddle Road.” This Master Plan was directed to include provide for Plan enforcement and amendment. DLNR, The Mauna Kea Plan (May 1977), p. 2.
422. The plan was prepared by DLNR staff, and approved on February 11, 1977 following two public hearings. Ex D-3 p 2-3
423. The Mauna Kea Plan is a policy guide on land use and management adopted by the board of Land And Natural Resources; the plan shall be reviewed annually, and any proposed amendments shall be in accordance with procedures adopted by the Board. Ex D-3 p 10
The area covered by this plan extends from the summit down to about 6,000 feet, and includes all conservation district land from the summit of Mauna Kea down to the Saddle Road. Ex D-3 p 1

424. The objectives of the plan were to determine the capability of Mauna Kea's resources to accommodate various uses without unacceptable damage to biotic and other natural values and historic values, and the visual appearance of the mountain, and to recognize the significance of MK's summit for astronomical research and let a limitation on facilities based on need and environmental concerns. Ex D-3 p 1
425. Any use of the lands will be, however subject to regulations under County, State and Federal laws. Ex D-3 p 5
426. No application for any proposed facility shall have final approval without the applicant having first filed, with the board, adequate security equal to the amount of the contract to construct the telescope facilities, support facilities and to cover any other direct or indirect costs attributed to the project. Ex D-3 p 5

THE 1995 REVISED MAUNA KEA MANAGEMENT PLAN

427. In 1995 the BLNR and the University sought to amend the MKSRCDP to address Commercial Use and Public Access. It states "This revised public access management plan supersedes and replaces the management plan approved by BLNR on Feb. 22, 1985 in CDUA HA1573. This plan differs from the plan approved in 1985 in the following manner":
1. Management and enforcement of public and commercial use of MK is the responsibility of DLNR except for specific rights reserved for UH.
 2. Permitted Commercial uses and management controls are incorporated in the Plan.
 3. Some controls are eliminated and/or modified and new ones added to reflect UH's experience in the past ten years, especially since the major portions of the road have been paved. The primary criterion for controls, however, has been and continues to be public safety. Ex D-10 p (i) 1995 Management Plan
428. The 1995 Management Plan, in turn, directly relies on the 1977 DLNR Mauna Kea Plan, the (1983) Science Reserve Complex Development Plan, and the Hale Pokaku Master Plan, for astronomy related uses. Ex D-10 p 7 1995 Management Plan

429. DLNR has the authority to determine permitted public and commercial uses of the UH Management Area—subject to terms of Lease between UH and DLNR. Management and enforcement of public and commercial use of Mauna Kea is the responsibility of DLNR—except for specific rights reserved to UH. Ex D-10 1995 Management Plan P 1

430. The 1995 Revised Plan --Part III: Management and Controls on page 7, states: “Astronomy-related uses in the UH Management Area are controlled by the 1977 DLNR Mauna Kea Plan, the Hale Pohaku Master Plan, the SRCDP, and the CDUA process.” Ex D-10 p 7 1995 Management Plan

431. While the number of telescopes/observatories already exceeds the upper limit named by the University in the earlier management plans, under the current management, the University has proposed twelve additional telescopes during the past ten years. Ward TR 9.30.11 p 72 24-25, Nagata Tr. P 126: 10-25, p 127: 1-13.

2000 MASTER PLAN

432. The 2000 Master Plan was never adopted nor approved by BLNR. Ex A-308 FEIS p 3-146

433. In the 2000 Master Plan, the University concluded that there was a need for a single entity to manage the comprehensive plan for the Science Reserve. Ex A-301 CMP P 3.8

434. The objective and goals of the 2000 Master Plan is to preserve and protect the cultural, natural, recreational and scientific resources on UH lands. Nagata 8.17.11 p 110 23-25

435. The 2000 Master Plan calls for the management organization to be housed within the University system and funded as an ongoing program unit of the University of Hawai‘i at Hilo (UH-Hilo). Ex A-301 CMP P 3.8

436. In accordance with the 2000 Master Plan, UH-Hilo Chancellor established the OMKM on August 1, 2000. (Ex A-301 CMP P 3.8)

437. OMKM is the office charged with ensuring compliance with and implementation of the 2000 Master Plan. (Ex A-301 CMP P 3.8)

438. The 2000 Master Plan acknowledged that joint management by DLNR and the University, and layers of management requirements and recommendations outlined in historical leases, plans, permits and written or verbal commitments, have created a complex and often confusing pattern of management responsibility (Group 70 International 2000). (Ex A-301 CMP P 3.9)
439. The acceptance of the 2000 Master Plan by the UH Board of Regents prompted the creation of OMKM, the MKMB, and Kahu Kū Mauna. (Ex A-301 CMP P 3.9)
440. Under the 2000 Master Plan, at least some of MKSS' services are to be transferred to OMKM, but no deadline was specified and the transfer has not occurred. (Ex A-301 CMP P 3-11)
441. The University developed a BOR-approved 2000 Master Plan, and eleven years have passed; the position of Director of Office of Mauna Kea Management at UH Hilo has remained unfilled for the past three years. Ward Tr.R 9.30.11 p 70 18-25
442. The University handpicks the members of the Mauna Kea Management Board (MKMB with no input from the community. Ward Tr. 9.30.11 p 71 1-4
443. The University's 2000 Master Plan for the UH Management Area designated 525 acres (212 ha) of the leased land as an "Astronomy Precinct," where development is to be consolidated to maintain a close grouping of astronomy facilities, roads and support infrastructure (Group 70 International 2000). Ex A-301 CMP P 3-1
444. Any future development would occur within the Astronomy Precinct portion of the UH Management Areas, as delineated in the 2000 Master Plan (Group 70 International 2000). Ex A-301 CMP P 6-8
445. Any potential future observatories will be located inside the Astronomy Precinct. The goal of this process is to refine telescope siting areas defined in the 2000 Master Plan based on updated cultural and natural resource information (see Section 7.1.1 and Section 7.1.2). (Ex A-301 CMP Pg 7-57)
446. The astronomy precinct was established with the Master Plan in 2000. Nagata DT 8.17.11 p 187 1-3
447. The astronomy precinct was established as a result and response to the community's concern for development on Mauna Kea. The University limited development on Mauna Kea to the specific area called the Astronomy precinct.

- Nagata DT 8.17.11 p 187 8-12
448. The astronomy precinct was designed specifically for astronomy development on the summit of Mauna Kea. Nagata Tr 8.17.11 p 187 22-25
449. The astronomy precinct is a subset of the Science Reserve. Nagata Tr. 8.17.11 p 187 13-15
450. The astronomy precinct is 525 acres. Nagata Tr. 8.17.11 p 187 16-17
451. Development would be limited to the Astronomy Precinct. Nagata Tr 8.17.11 p 187 18-19
452. The 13 number for telescopes is just a quantifiable number that people talk about. Nagata Tr 8.18.11 P 35 17-18
453. An approved management plan must be in place prior to the construction and operation within a resource subzone (HAR 13-5-39); a BLNR- approved comprehensive management plan must also be developed prior to construction and operation of such as facility. ExA-308 FEIS Section 3.10 p 3-142

THE UNIVERSITY'S COMPREHENSIVE MANAGEMENT PLAN (UH CMP)

454. The Applicant relies on the UH CMP and its four subplans and the TMT Management Plan to fulfill the "approved management plan" requirement for its CDUP application (CDUA HA-3568) under HAR §13-5-24. The Applicant claims the proposed use is consistent with the provisions of the CMP and subplans, the approved management documents for the UH Management Areas on Mauna Kea. Ex A-311 CDUA TMT Management Plan p 3-11 Section 3 Management and Controls
455. The CMP is described as "the framework for managing multiple existing and future activities, such as astronomy, recreational and commercial activities, scientific research, and cultural and religious activities." (Ex. Jt-1/A-301, page 2-1)
456. The TMT Management Plan is a "project-specific management plan." Ex A-311 UH/TMT CDUA, p. 2-3.

457. The CMP is described as being in accordance with the Third Circuit Court's ruling in 2007 regarding the inadequacy of the University's management plan proposal at the time. (Ex. Jt-1/A-301, page 2-1)
458. In its 2007 decision and order, the Third Circuit Court found that the definition of management plan in HAR 13-5-2 requires the plan to be HAR 13-5-2 "comprehensive," that is an "all-covering, all-embracing, all-inclusive" "plan for carrying out multiple land uses" for the conservation of resources on Mauna Kea. (Ex. Jt-1/A-301, page 2-2, Ex. B-15, Mauna Kea Anaina Hou v. BLNR, Civ. No. 4-1-397, 7 (3rd Cir. Haw. Jan, 19, 2007))
459. The Third Circuit Court also found that the "resource that needs to be conserved, protected, and preserved is the summit area of Mauna Kea," (Ex. B-15, page 13)
460. As identified in the first management plan for the mountain, the Mauna Kea conservation district extends from the summit down to the 6,000-foot elevation and includes all lands from the summit to Saddle Road, including the Mauna Kea Forest Reserve and Game Management Area, and Ka'ohe Game Management Area. (Ex. D-3, page 1)
461. The CMP only applies to the "UH Management Areas" (described as "the Mauna Kea Science Reserve (Science Reserve), the mid-level support facilities at Hale Pohaku, and the Summit Access Road..."). (Ex. Jt-1/A-301 page 2-1)
462. The Third Circuit Court also found that where the 1995 management plan "was virtually silent" on the number and size of future telescopes on Mauna Kea, it did not satisfy the requirement for a comprehensive management plan. (Ex. B-15, page 3-4)
463. "Proposed new development on Mauna Kea, including the Thirty Meter Telescope (TMT)" is outside of the scope of the CMP. Ex A-301 CMP, p. 2-3.
464. The Applicant acknowledges that "this CMP does not address development plan issues related to future observatories, including whether new observatories should be located on Mauna Kea to support the astronomy program or if observatories should have their leases extended or be decommissioned." (Ex. Jt-1/A-301, page 7-54)

465. The CMP does not provide a limit on the number or size of future telescopes in the Mauna Kea Conservation District. (Ex. Jt-1/A-301 page 7-56)
466. The CMP describes the need to complete, among other things:
- a burial treatment plan because Mauna Kea is a known burial site (Jt-1/A-301, page 7-10)
 - buffer zones to protect archaeological sites (Jt-1/A-301, page 7-10, 7-56)
 - invasives species control plan (Jt-1/A-301, page 7-16 thru 7-18)
 - emergency hazardous spill protocol (Jt-1/A-301, page 7-44)
 - permitting process for traditional and customary practices deemed appropriate (Jt-1/A-301, page 7-8 thru 7-10)
467. The CMP does not provide a timeline for completing these tasks and provides no process for public or agency oversight consistent with Chapter 91, HRS. (Ex. Jt-1/A-301)
468. The CMP specifically identifies the following measures as being among those Native Hawaiian rights for which access will be maintained insofar as they are consistent with other management actions: ...gathering of cultural resources..., Access for families to visit iwi kupuna..., Access to scatter ashes..., Access through trails for hunting and gathering..., Access to deposit piko..., Access for traditional...religious and spiritual observances..., Pilgrimage, offerings, and prayers, and Access to Lake Waiau to gather water for religious and spiritual purposes. Exh A-313 Staff Report Feb 25, 2011, p.11
469. An effective management has timelines established, benchmarks to evaluate effectiveness of outcomes, effective DLNR oversight and consultation, and enforcement for failure to act. The CMP does not have these. Ward TR 9.30.11 p 72 1-4
470. Upon approval of the CMP, the BLNR made the UH BOR responsible for implementing the CMP. In accepting that responsibility, the UH BOR delegated implementation of the CMP through normal UH governance channels to UH Hilo, OMKM, and MKMB and also assigned two members of the UH BOR to sit as ex-officio, nonvoting members on the MKMB. Ex A-308 FEIS section 3.10 Land Use Plans, Policies and Controls p 3-148
471. “OMKM’s responsibilities are complicated by the fact that the UH Management areas are governed by two overarching documents—the Master Plan 2000, which

- was not approved by the Board of Land and Natural Resources, thus requiring UH to continue to comply with the rights and responsibilities outlined in the 1995 Revised Management Plan.” Ex A-303 CRMP 3.2.1 OMKM Mission and Responsibilities 3-3
- 472.OMKM Acting Interim Director Nagata stated that she has not discussed priority actions with DLNR staff. Nagata Tr 8.17.11 p 146 -12
- 473.The University of Hawaii is an educational institution, not a land management agency. HRS 304A-102
- 474.The budget for implementing the CMP is \$1.5-\$1.8 million for the first year. Nagata Tr 8.17.11 p 184 5-6
- 475.OMKM currently has two individuals on staff: an acting executive director and a secretary. Nagata, Tr. 8.17.11, p. 145:10-12
- 476.The University has not hired any natural or cultural resource staff over the last ten years implement management objectives of past plans or manage natural and cultural resources on Mauna Kea. Ward TR 9.30.11 p 72 5-14; Nagata Tr 8.17.11 p 128 22-24
- 477.OMKM is responsible for 103 management actions. **It isn’t possible to carry out these responsibilities with current staff.** (emphasis added) Nagata DT 8.17.11 p 145 10-22
- 478.The rangers who work for OMKM, but work closely with Mauna Kea Support Services, do not have the primary enforcement authority. Byrne DT 8.18.11 p 195 22-25
- 479.The plans, permits, monitoring, control, and remediation efforts necessary to implement necessary management actions do not exist. Ward TR 9.30.11 p 72 5-14
- 480.The UH/TMT CDUP Application refers to the 2000 Master Plan on pages 1-6, 1-8, 2-8, 2-11, 2-17, 2-18, 2-22, 3-8, 4-6, and 7-2. Ex A-311
- 481.The MP 2000 and CMP do not offer a rationale for the carrying capacity for the mountain, nor do they provide an accurate estimate of future development

proposals anticipated. Ward TR 9.30.11 p 72 1-7

482. At the oral arguments before the Intermediate Court of Appeals on the appeal of the BLNR's decision to deny a contested case hearing on the CMP to some of the Petitioners in the present case, counsel for the University conceded that the CMP "do[es] not take action". (See, http://www.courts.state.hi.us/courts/oral_arguments/archive/oaica30397.html, accessed on November 13, 2011 at minute 43:29)
483. University counsel said: the "management plan itself demonstrates these are management measures that the University has been doing for quite some time and can do." (See, http://www.courts.state.hi.us/courts/oral_arguments/archive/oaica30397.html, accessed on November 13, 2011, at minute 41:46)
484. At the BLNR public hearing to consider the TMT CDUA, several Native Hawaiian cultural practitioners, including several individuals represented by the Petitioners, asserted their objections to approval of the CDUA and that their constitutionally protected traditional and customary practices would be harmed by the construction of the proposed TMT project. (Ex. B-33, pages 17, 19, 23, 27, and 29)
485. Thirty-three kupuna practitioners of Mauna Kea submitted a letter to the BLNR at the public hearing documenting how construction of the TMT would harm their constitutionally protected traditional practices as Native Hawaiian cultural practitioners engaging in practices that have been conducted for as long as anyone can remember. (Ex. B-33, pages 23)
486. At the public hearing, OCCL Staff acknowledged that telescope activities do interfere with the quiet enjoyment of the mountain and thus added a condition to the TMT CDUA requiring that 4 days be set aside for reduced activities at the TMT. The OCCL staff said: "Shut the lights down a bit; shut the process down so that on certain days Native Hawaiians can have even more solitude." (Ex. B-33, page 8)
487. The BLNR Chairperson asked the Applicant by what method would the cultural practices harmed by the approval of this CDUA be protected. (B-33 page 34-35)
488. The Applicant, represented by Ms. Nagata, admitted that the University did not have a process to ensure the protection of traditional and customary Native

Hawaiian practices. (B-33 page 34-35)

489. Neither the BLNR's April 9, 2009 approval of the CMP or the March 25, 2010 approval of the 4 subplans document any specific findings by the BLNR regarding the 3-part analysis required by the Court's decision in *Kapa`akai*. (Ex. B-41, B-42)
490. All of the 11,288 acres leased by the University on Mauna Kea are designated as a conservation district. (Jt-1/A-301, page 3-1)
491. The University subdivided the 525-acre Astronomy Precinct from rest of the 11,288 acres it leases from the DLNR. Ex. A-1, page 5
492. As explained by the Applicant, the University "subdivided" the 11,288 acres it leases on Mauna Kea to ensure that all future "telescope development is limited to the Astronomy Precinct". (Ex. A-1, page 5, Nagata, August 17, 2011, Tr. 187:7-25, 188:15-18)
493. "The University's 2000 Master Plan for the UH Management Area designated 525 acres (212 ha) of the leased land as an "Astronomy Precinct," where development is to be consolidated to maintain a close grouping of astronomy facilities, roads, and support infrastructure." (Jt-1/A-301, page 3-1 (citations omitted).
494. In addition, the CMP directs decision-makers "to site all new proposed astronomy facilities in the area within the Astronomy Precinct identified as the north plateau." (Ex. Jt-1/A-301 page 7-56)

II. THE THIRTY METER TELESCOPES OBSERVATORY PROPOSAL

495. The proposed site for the TMT Observatory is a roughly 5-acre area at the end of a four-wheel drive road at an elevation of 13,150 feet on the Northern Plateau of Mauna Kea. Ex A- 308 FEIS, Vol. 1 p. 2-10.
496. Roughly 6.2 acres of previously undisturbed land will be disturbed by the TMT Observatory and Access Way. Ex A- 308 FEIS Section 3.2 Cultural Resources Page 3-26
497. There are no current developments on the Northern Plateau. Ex A-313 Staff Report Feb 25, 2011, p.7

498. TMT is being proposed for an area on the North Plateau of Mauna Kea that has not hosted permanent facilities or developments. It is opening up a new area. Exh A-313 Staff Report Feb 25, 2011, p 59
499. The TMT's footprint will be a minimum of 8.5 acres on a pristine plateau. DLNR staff report Feb 25, 2011 p.K-1
500. The total dome height will be 184 feet above finished grade, with an exterior radius of 108 feet. Ex A-313 Staff Report Feb 25, 2011, p.15
501. HAR 11-200-12 states: "In Determining whether an action may have a significant effect on the environment, the agency shall consider every phase of a proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short term and long term effects of an action. In most instances, an action shall be determined to have significant impact if it: (13) Requires significant energy consumption." HRS 11-200-12 (Significance Criteria).
502. The TMT will have significant power requirements. Ex A-313 Staff Report Feb 25, 2011, p.45
503. The existing peak demand load documented by HELCO at the substation, including all the observatories and the Hale Pohaku facilities, is 2,230 kW, approximately less than half of the capacity of the substation. Of this current use, the Keck observatory uses approximately 350 kW of power on average. Ex A-308 FEIS Section 3.12 Power and Communications p 3-169
504. Preliminary design electrical load estimates indicate that the TMT Observatory will operate with a "Peak Demand" of 2.4 MW. To adequately support the peak power requirement... two transformers will be upgraded at the existing HELCO substation at Hale Pohaku. Ex A-308 FEIS Section 3.12 Power and Communications p 3-169
The HELCO transformers at Hale Pohaku need to be upgraded because the anticipated power demand from TMT and the other observatories necessitates upgrading the equipment. Sanders Tr. 8.15.11 P 86 20 -25, p 87 1-2
505. The existing electrical power lines that run from Saddle Road to Hale Pohaku and up to the summit of Mauna Kea create an electromagnetic field along with the electrical current flowing in the lines. (R. McLaren, Tr. Aug. 18, 2011, p. 180:17-

23)

506. The TMT Project would result in HELCO having to upgrade the two transformers with the Hale Pohaku Substation. (Ex. A-311, CDUA, p. 1-13)
507. The TMT Project would result in HELCO having to also upgrade the existing electrical service by replacing the existing wire conductors with new higher-capacity conductors in the underground conduits that run from the Hale Pohaku Substation to the summit area. (Ex. A-311, CDUA, p. 1-14)
508. New electrical power lines and conduits would be extended into the northern plateau for the TMT Project where they are none installed at the moment. (B. McLaren, Tr. Aug. 18, 2011, p. 180:19-25)
509. DOFAW notes...Not knowing the actual alignment makes it difficult to assess the potential impacts of the project, although, the powerline will pass through the Mauna Kea Ice Age Reserve in some locations. Ex A-313 Staff Report Feb 25, 2011, p.23
510. The Department of Health Clean Water Branch (CWB) notes that the project will need to be compliant with the criteria set out in the Anti-degradation Policy (HAR ss11-54-1.1) and Designated uses (HAR ss11-54-1.1) regarding impacts on state waters. Ex A-313 Staff Report Feb 25, 2011, p.25
511. The building and operation of the TMT Observatory on Maunakea will require a sublease from UH, which lease this ceded land from DLNR. The sublease will be subject to approval first from the TMT board and the UH BOR followed by approval from BLNR. Ex A- 308 FEIS section 3.10 Land Use Plans, Policies and Controls p 3-159
512. The current UH lease expires in 2033 and the TMT Observatory will be required to be decommissioned and restore the site at that time, unless a new lease is obtained from the BLNR. Ex A- 308 FEIS section 3.10 Land Use Plans, Policies and Controls p 3-160
513. The TMT would take approximately five years to decommission. Sanders Tr. August 15, 2011, P 82: 2-5
514. The TMT will require a sublease for use of the land on Mauna Kea leased to the University. (Sanders, Tr. August 15, 2011, 100:11-13, Nagata, Tr. August 16,

2011, 208:15-17)

515. The terms of the sublease to the TMT Observatory Corporation are not known, but are expected to be similar to the terms of current subleases for telescopes on Mauna Kea. (Sanders, Tr. August 15, 2011, 82:12-24, 99:24-101:4, Nagata, Tr. August 16, 2011, 211:21-25)

III. IMPACTS OF THE PROPOSED PROJECT

516. The Applicant contends that because impacts are already substantial, adverse and significant, adding more to that impact is not going to change those impacts, while simultaneously claiming their proposed mitigation measures will offset and reduce the negative impacts to less than significant. (Pisciotta, Tr. September 30, 2011, p.136:25, 137:1-6)

517. To authorize the construction of yet another telescope on the very thin basis that one more is a "minor contribution" to a cumulatively adverse impact would constitute a breach of trust. The TMT project proposes yet another violation of the state of Hawai'i's trust responsibilities to the Hawaiian people. The State's Board of Land and Natural Resources is entrusted to manage the "public lands" constituted in part by Mauna Kea and to fulfill constitutional and statutory obligations to Hawaiians. Ex.B20 Expert Witness, Dr. J. Kehaulani Kauanui's WDT, p. 2-3

A. Natural Resources

WATER RESOURCES

518. The Applicant concedes that the TMT Observatory, new Access Way, and potential Mid-Level facility, would result in all precipitation recharging underlying aquifers because runoff would be directed to nearby areas where it would percolate into the ground. Ex A-308 FEIS Section 3.7 Water Resources and Wastewater p 3-120

519. The entirety of the Astronomy Precinct, which includes the TMT Observatory site and the Batch Plant Staging Area, is located above the Waimea Aquifer. Ex A-308 FEIS, Vol. 1, p. 3-115.

520. "Threats to the hydrology of Mauna Kea include those associated with human presence and activity on the mountain and climate change. Human activities that

have the potential to impact water resources quality, and to a lesser degree quantity, include any actions that add to the current wastewater volume or that change in-situ patterns of water movement. Examples are: leaking facility pipes; accidental spills of contaminants; and improperly filtered wastewater. These contributions may affect the quality of water seeped to springs along Mauna Kea's flanks, as well as the fresh water aquifers beneath the mountain." Ex A-302 CMP CMP NRMP, p. 2.1-38.

Hazardous Materials

521. Observatory facilities and support operations housing any potentially hazardous materials are required by law to have spill response and associated safe handling protocols in place. Situations in which a potential release might occur include discharge of liquid waste from septic tanks and cesspools, malfunction of sewage pipes, transport of sewage and hazardous materials, activities requiring the handling of potential contaminants, and vehicle use. Ex A-302 CMP NRMP 4.2-13
522. Threats to the natural environment due to escape and possible subsequent migration of contaminants vary depending upon the type of contaminant, release volume, and location. The fate and transport of byproducts and potentially hazardous materials used on Mauna Kea have not been determined, and an assessment of the potential risks following a release has not been developed. Ex A-302 CMP NRMP 4.2-13
523. The Final EIS describes a spill protection and response plan for accidental spills of hazardous materials, petroleum products, sewage waste. Mr. Hayes stated that it is not available for review. Hayes Tr. 8.16.11 p 135: 1-7
524. Spills of oil, sewage and hazardous chemicals have been repeatedly reported by researchers working at the summit, and they note that oil, in particular, will take a long time to biodegrade because of cold and dry conditions (Howarth 2003). Ex A-309b App K Englund Vol III of FEIS
525. The TMT project would require the use, handling and storage of hazardous materials at Mauna Kea including: propylene glycol, acetone, methyl ethyl ketone, at least 2,000 gallons of diesel fuel, ethylene glycol, hydraulic fluid, liquid adhesives, coating metals, acids, paints, solvents, and other cleaning chemicals. Ex A-308 CMP FEIS Vol. 1, p. 3-129.

526. Petroleum spills outside of telescope facilities are investigated by rangers, reported to OMKM, acted on as the law requires, and if a major spill handled by MKSS. Byrne Tr. 8.18.11, p 197: 20-25, 198: 5-10
527. Solid chemicals used for the TMT include: potassium hydroxide, copper sulfate, calcium carbonate, potassium ferricyanide, sodium thiosulfate, solder (Kester 24-7068-1411), chromium, silver, aluminum, nichrome 80/20, tantalum, hafnium, zirconium, titanium, yttrium, and tin. Exhibit B-37, "Mirror Lab Chemicals" received from UH.
528. Gases used for the TMT include: argon, helium, oxygen, nitrogen, sulfur hexafluoride, and carbon dioxide. Exhibit B-37, "Mirror Lab Chemicals" received from UH.
529. About 0.5 gallons of hydraulic fluid spilled in the Canadian France-Hawaii Telescope (CFHT) facilities in 1979. Ex A-301 CMP, p. 6-9.
530. An unknown amount of diesel fuel leaked from a generator in the construction staging area in 1982. Ex A-301 CMP, p. 6-9.
531. Mercury spills occurred in the NASA IRTF (1989), CFHT facility (1990), W.M. Keck Observatory (1995), CFHT (1998) and the UH 2.2-m telescope facility (1998). Ex A-301 CMP, p. 6-9 and 6-10.
532. "Transport of contaminants through the substrate has the potential to impact the quality of both surface water and groundwater. Direct toxic impacts on flora or fauna are also possible." Ex A-301 CMP, p. 6-14.
533. "The highest probability of impact [on surface water, groundwater, and flora or fauna] is from petroleum products (e.g., fuel for vehicles and backup generators, lubricants, and cleaning fluids) and human waste." Ex A-301 CMP, p. 6-14.
534. "The main activities that have potential to result in a release of contaminants include vehicle travel (on and off road) and accidents; release of hazardous material and petroleum product use by observatories and support operations; sewage generation; and transport of hazardous materials and sewage off-site." Ex A-301 CMP, p. 6-14.
535. Approximately 60 gallons of diesel fuel, engine and hydraulic oil were spilled onto surface cinder near the VLBA, requiring the removal of cinder, in 1995. Ex

A-301 CMP, p. 6-9.

536. In 1996, 110 gallons (two 55 gallon containers) ruptured and spilled onto cinder surrounding the Subaru telescope, requiring removal of excavated cinder. Ex A-301 CMP, p. 6-9.

537. Hydraulic fluid leaked from the Caltech Submillimeter Observatory (CSO) from approximately 1990 through 2000. Ex A-301 CMP, p. 6-10.

538. In 2003 at Hale Pōhaku, crankcase oil and hydraulic fluid leaks onto the ground requiring soil excavation and transmission oil leaked onto surface cinder, which likewise had to be excavated. Ex A-301 CMP, p. 6-10.

539. Decaying seals on the Smithsonian Astrophysical Observatory Submillimeter Array allowed hydraulic fluid to leak in 2003. Ex A-301 CMP, p. 6-10.

540. From 1998-2004, sewage overflows of several liters occurred five times at the CSO facilities. Ex A-301 CMP, p. 6-10.

541. Decaying seals on the Smithsonian Astrophysical Observatory Submillimeter Array allowed diesel fuel to leak in 2004. Ex A-301 CMP, p. 6-10.

542. Twenty to thirty gallons of propylene glycol spilled at the W.M. Keck Observatory in 2004, with approximately two-thirds of that volume introduced into the outside environment. The contamination required removal of cinder. Ex A-301 CMP, p. 6-10.

Mirror Washing and Aluminizing Chemicals

543. Liquid chemicals used for the TMT include: methyl alcohol, isopropyl alcohol, methyl ethyl ketone, hydrochloric acid, nitric acid, ceric ammonium nitrate, hydrofluoric acid, chromic acid, acetone, lubricating oil, ethylene glycol, first contact spray solution, epoxy adhesives (3M 2216 Gray B/A, 3M DP – 490 B/A, HYSOL EA9360, and EPOTEK 301), cyanoacrylate adhesive, adhesive silicone GE RTV-100, spray adhesive 3M blue 72, primer (Dow-Corning – Silane Z-6020), Cytec BR127 primer, vacuum grease braycote 601, vacuum grease krytox-LVP, Irylox GPL216(w/NoS2), antiseize lubricant permatex 80078, loctite 277, loctite 262, loctite 222, and electrically conductive silver paint (Ag). Exhibit B-37, “Mirror Lab Chemicals”.

544. Telescope mirror washing entails removing mirrors from a protective girdle that contains mercury. Seven documented mercury spills have occurred in association with mirror washing. Ex A-301 CMP p. 6-8.
545. Waste from mirror washing will be collected, removed, and transported off site for treatment and disposal. Ex A-308 FEIS Vol. 1, p. 3-129.
546. The Applicant maintains that mirror washing wastewater is not a hazardous waste. Ex A-308 FEIS Vol. 1, p. 3-129.

Sewage/ Wastewater

547. “A two-gallon sewage spill from an incorrectly installed septic line contaminated cinder and snow in wēkiu bug habitat in the Pu‘u Hauoki crater in 1998.” Ex A-302 CMP NRMP p. 3-34.
548. Approximately 500 – 1,000 gallons of sewage overflowed from the septic tank at Hale Pōhaku and was allowed to percolate into the surrounding environment in 2008. Ex A-301 CMP, p. 6-10.
549. In 1998, a septic tank spilled approximately 2 gallons of sewage onto the ground snow near the Subaru telescope. Ex A-301 CMP, p. 6-9.
550. TMT project managers anticipate the generation of approximately 120 cubic feet of trash per week. Ex A-308 FEIS Vol.1, p. 3-129.
551. There are eight septic tanks with leach fields or disposal pits and three cesspools in the UH Managed Areas. Ex A-302 CMP NRMP, p. 3-33.
552. Approximately 53,990 gallons of wastewater are generated each month by existing telescopes on the summit. (Calculations based on Ex A-302 CMP NRMP, p. 3-9).
553. Large sized tank trucks have carrying capacities ranging from 5,500 to 9,000 gallons. Ex A-309 FEIS Vol 1: 3-120
554. UH estimates 2,080 gallons per day will be used by the (480 gpd) TMT Observatory and the Headquarters. (1,600 gpd). Ex A-302 FEIS Vol. 1, p. 3-120.
555. To transport 14,600 gallons of water generated by the TMT Observatory down the mountain each month would require a tanker truck to use the Access Way at least

1-2 times each month. Ex A-309 FEIS Vol 1: 3-120

556. Risk assessment and spill response planning provides a measure of safety for human health and for the protection of the cultural and natural resources of Mauna Kea. Although the observatories have individual spill response plans, such plans are lacking for other transporters or users, such as those that might result from vehicle accidents. Ex A-302 CMP NRMP 4.2-14

GEOLOGY

557. Telescope activities on Mauna Kea have resulted in substantial, significant and adverse impacts to geologic resources, primarily due to alteration of the cinder cone morphology. Ex A-308 FEIS Section 3.6 Geology, soils, and Slope Stability p 3-111

National Natural Landmark

558. “The National Park Service contends that the permanent destruction of any surface geologic structures within the Mauna Kea NNL is significant and it denigrates from its overall status as a national natural landmark. “Rory Westberg, Acting Regional Director, NPS Ex A-309 FEIS Vol II p 5 of 531

559. “[T]he review of the DEIS has brought to our attention the incremental addition with resultant impacts of ten observatories to Mauna Kea NNL since its establishment as a national natural landmark in 1972. Realizing that additional observatories may be a consideration in the future, the NPS intends to review the current NNL designation and at the very least may consider removal of the 525 acre Astronomy Precinct from the current MK NNL designation.” Rory Westberg, Acting Regional Director, NPS Ex A-309 FEIS Vol II p 6 of 531

AEOLIAN ECOSYSTEMS

560. It is impossible to accurately predict the exact plant species which will invade the subalpine and alpine zones on Mauna Kea in the future, but managers must be especially aware of plant species that are adapted to dry climates, early successional habitats, high elevation climates, have wind dispersed seeds, and or that originate from the temperate zone. Ex A-302 CMP NRMP 2.2-21

561. There are several invasive plant species that may become established in the subalpine and alpine zone in the future, particularly if anthropogenic climate change affects rainfall regimes in the Hawaiian Islands. Ex A-302 CMP NRMP 2.2-21

562. “Habitat alteration threatens native invertebrate communities by directly removing habitat (through development) or changing it to the extent that the invertebrates are no longer able to live there (for example, by changing host-plant abundances).” Ex A-302 CMP NRMP, p. 2.2-43.

563. A threat to high elevation environments on Mauna Kea exists in invasion by new plant species that are adapted to subalpine, alpine or arid environments. These can be introduced through ...accidental introduction through human activities (such as seeds stuck to vehicles or visitors shoes). Ex A-302 CMP NRMP p. 2.2.20

564. Approximately 9% of non-native species found growing at high elevations in the Hawaiian Islands were first recorded in the past thirty years. Ex A-302 CMP NRMP 2.2.20

FLORA

565. Habitat Disturbance should be minimized - The rocks and cinder within Area E are home to lichens, mosses, and endemic arthropods, therefore disturbance should be minimized at the construction site and in the surrounding habitats. Ex. A309b or A35 (TMT FEIS, Arthropod and Botanical Inventory and Assessment), App. K, p. 31

566. The botanical survey and collection of specimens in Area E was **only done in 2 days**. As a result, the botany inventory and assessment for this project is incomplete at this time. (Emphasis added) Ex. A-10 (C. Smith), WDT, p. 2

567. Identification to the species level for all specimens was not feasible in the time frame for this study. Ex. A309b or A35 (TMT FEIS), App. K, p. 11

568. A walk-through survey method was used to inventory the lichens and bryophytes in Area E on September 29-30, 2008. Ex. A309b or A35 (TMT FEIS), App. K, p. 12

569. This area surveyed was confined to Area E, a 34-acre zone near the 13N Site located on the North Plateau of the Mauna Kea Science Reserve. Ex. A-10 (C. Smith) WDT, p. 2

570. Dr. Smith disclosed that “a concise determination of some species is not possible under the time constraints of this study even though fruiting bodies may be present. Species growing in such severe habitats, particularly those growing on rocks, produce spores only during favorable conditions. **The only sure way of**

- finding good specimens would be to conduct monthly collections for at least one year.”** (Emphasis added) Ex. A-10, (C. Smith), WDT, p. 9
571. Furthermore, C. Smith stated that “Large specimens were collected of **species of whose identity were uncertain** so they could be sent to other lichen experts for confirmation of their identity.” (Emphasis added) (Ex. A-10, C. Smith DWT, p. 2)
572. Dr. Smith disclosed that **there are 4 species still not identified** within the proposed TMT site. As a result, the botanical inventory and assessment for this project is incomplete at this time. (Emphasis added) Tr. Aug. 16, 2011, p. 185:9-15
573. One species currently considered a species of concern by the USFWS, the Douglas’ bladderfern (*Cystopteris douglasii*), are known to occur in the Maunakea summit region. The Douglas’ bladderfern was found throughout Area E. Ex. A309 or A35 (TMT FEIS), p. 3-65
574. **Species of Concern** are those species about which regulatory agencies have some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the Endangered Species Act. Ex. A309 or A35, (TMT FEIS), p. 3-65
575. Dust can impact lichens, mosses, and ferns and is believed to degrade Wekiu bug habitat. Ex. A309b or A35, (TMT FEIS), App. K, p. 31
576. Wind-blown dust that covers plants, lichens and mosses, deprives them of needed sunlight. The potential impact of excessive dust could have a moderate effect on the flora in habitats adjacent and downwind of the Access Way and TMT Observatory. Ex. A309 or A35, (TMT FEIS), p. 3-74
577. It was disclosed by C. Smith during cross-examination that it would take 100 years for flora to regenerate after the proposed excavation & disturbance at TMT site. (C. Smith, Tr. Aug. 16, 2011, p. 185:9-15)
578. Non-native plant species can impact native plant communities by altering the environment, by lowering the groundwater table changing fire regimes, increasing or decreasing shade, smothering plant growth. Ex A-302 CMP NRMP 2.2-18
579. Invasive plants currently found in the in the subalpine and alpine plant communities at Hale Pohaku include the non-native grasses and invasive herbs

such as common mullein (*Verbascum thapsus*) and fireweed (*Senecio madagascariensis*). Ex A-302 CMP NRMP 2.2-19

580. Although not recorded in plant surveys in 1979, 1985, 1990 or 1999, fireweed (*Senecio madagascariensis*) was found in 2007 at Hale Pohaku, the summit access road, MK Ice Age NAR, and near the summit. Ex A-302 CMP NRMP 2.2.-20

581. Invasive plants are spreading up the mountain. This can be easily observed by the way many invasive plants, such as common mullein, line the roadways up the mountain. Ex A-304 CMP Mauna Kea Public Access Plan (PAP) p 2-24

582. OMKM Interim Director Nagata was not aware that mullein is in the Science Reserve. Nagata DT 8.18.11 P 45 16-19

ARTHROPODS

583. While the Natural Resource Plan, NR-9, states that areas of high native diversities, unique communities, unique geological features within the Astronomy Precinct should be considered for protection from development, **the Applicant stated that those areas have not yet been delineated.** Nagata Tr. 8.17.11, p 142: 3 236

584. It has been estimated that since 1963, approximately 62 acres (25 hectares) of potential arthropod habitat have been lost to astronomy-related development on the summit. Ex A-302 CMP, Natural Resources Management Plan, p. 2.2-43

585. The TMT Observatory would displace 5.9 acres of Wēkiu bug habitat. Ex A-308 FEIS, p. 3-72.

586. Dr. Francis Howarth and Dr. Fred Stone conducted an entomology study for the proposed telescope development area, in 1982, that study was incorporated into the FEIS for the MKSRCDP. They made recommendations for biological inventory, habitat mitigation and monitoring which were approved in the Mauna Kea Management Plan by BLNR in 1985. Ward WDT Ex D-1 p 6-7

587. Although these telescope construction activities and related infrastructure were done under the 1983 EIS and 1985 Management Plan, the mitigation measures

- were not implemented. Ward reported the impacts to the DLNR in 1996. WARD D-1 WDT p 7
588. Mike Wilson, head of DLNR at the time, admitted that the impacts had occurred, and that mitigation measures had not been implemented, but declined to administer penalties because permits had been issued for the construction activities. He also said that the CDUA permit applications by UHIfA did not include possible impact to Wēkiu bug habitat, nor mitigation measures, so there was no way for DLNR and BLNR to know about or evaluate the potential impacts. WARD D-1 WDT p 7, Exhibits D-7, D-5, D-6, D-7, D-8, D-9
589. DLNR in 1996 determined that the Gemini Northern 8-meter telescope, Japan National Large Telescope (Subaru), and the Smithsonian (SMA) had destroyed habitat beyond that disclosed in the FEIS or allowed in the approved management plan. Wēkiu bug habitat on the crater and slope of Pu'u Hau Oki was severely impacted by construction of the Keck I and II telescopes which resulted in removal of approximately 35 feet of the summit ridge of Pu'u Hau Oki and side-casting the material on the crater slopes. Ward WDT Ex D-1 p 7, Exhibits (D-14), Exhibit (D-07), Exhibit (D-06), Exhibit (D-5), Exhibit (D-08), Exhibit (D-09)
590. Wēkiu bugs habitat was previously found at the summit of Pu'u Hau Oki, and some of the other areas where development and telescope facilities and roads have been built, and therefore the habitat has been destroyed. Eiben, Tr. 8.18.11, p 133: 8-12
591. Wēkiu bug capture rates appear to be heavily influenced by climactic conditions such as presence of snow, which makes it difficult to compare capture rates across studies that were conducted during different conditions or time of year.” Ex A-301 CMP, p. 5-39 – 5-40.
592. Wēkiu bug capture rates declined an average of 99.7% in a 1997/8 study compared to the 1982 study. Ex A-309 FEIS Vol. 3, p. 927/ App Appendix K, p. 16.
593. Risks to the Wēkiu bug are nearly all human imposed. Eiben, TR. 8.18.11, p 132: 25,
594. The Wēkiu bug is a candidate for the endangered species list, due to its decreasing number, specialized habitat, constant impact of human activity, and myriad issues

with global warming. Eiben, TR. 8.18.11, p 133: 13-18

595. This listing is based on two criteria; its known threats are impacting the population of the organism, and evidence of significant population decline. The Wekiu bug was listed as a candidate for Federal protection on June 13, 2002. CDUA Section 2.3.
596. A prime example of habitat loss through development is the loss of Wekiu bug habitat on the summit through construction of telescope facilities. Wekiu bug habitat is easily altered by vehicular traffic and construction activity, as tephra cinders preferred by the bug are easily crushed into dust-sized particles. Prime habitat can be quickly degraded to compacted silt and mud by use of off-road vehicles. Wekiu bug habitat may also be altered by dust blown up from road grading and other construction activities on the summit. 2.2.2.3 Threats to Invertebrate Communities on Mauna Kea CMP NRMP p 2.2-43
597. Dust blown up from road grading and other construction activities on the summit can reduce surface porosity and fill pockets between cinders. This may degrade wēkiu bug habitat by inhibiting movement and by decreasing the accumulation of bugs blown up for wēkiu bug food consumption. Ex A-302 CMP NRMP, p. 2.2-44.
598. Wēkiu bug habitat is easily altered by vehicular traffic and construction activity, as the tephra cinders preferred by the bug are easily crushed into dust-sized particles. Ex A-302 CMP NRMP, p. 2.2-44.
599. The southern-most roughly 700 feet of the Access Way would be located on the Pu`u Hau`Oki cinder cone. Ex A-311 TMT CDUA, p. 141.
600. It should be noted here that the access way will alter, and destroy, known Type 3 Wēkiu bug habitat. DLNR Division of Forestry and Wildlife Administrator Paul J. Conry, CDUA Comments for the Thirty Meter Telescope wrote, November 29, 2010, Ex A-313 Staff Recommendations, p. 2-6.
601. The loose cinder adjacent to the existing 4X4 road at the base of Pu`u Hau Oki is highly suitable conditions for Wekiu bug habitat, consisting of different sized cinders larger than one-half inch in depth to two to ten inches. Eiben, Tr. 8.18.11, p 121: 170-25, p 122: 1-3

602. Construction of the access road will likely kill Wekiu bugs residing in the direct path of any rock movement. Eiben, Tr. 8.18.11, p. 124: 22-5
603. Existing habitat can be fragmented by creating non-optimal habitat between currently existing optimal habitat. Eiben, Tr. 8.18.11, p. 136: 8-10
604. The Arthropod and Botanical Inventory and Assessment (Appendix K in FEIS Vol. 3) recommends minimizing disturbance by limiting construction activities to the footprint pad and road improvements, and not side-casting cinder or other materials into adjacent habitat. Ex A-309 FEIS Vol. 3, p. 942/ Appendix K, p. 31.
605. “The cinder [in Access Way Option #3] is considered ideal Wēkiu bug habitat... option [3] would require disturbing the cinder cone and Wēkiu bug habitat, and the road would also bisect and isolate a portion of the habitat. While Wēkiu bugs have been observed crossing existing dirt roads, none have ever been observed on pavement. Because this option disturbs and displaces Wēkiu bug habitat, mitigation measures similar to those proposed in the Keck Outrigger would likely have to be implemented.” Ex A-309 FEIS Vol. 3, Appendix K, p. 24.
606. Option 3 is the proposed plan for the TMT Access Way. Ex A-311 TMT CDUA, p. 4-29.
“Option 3, developing the existing 4-wheel drive road as the Access Way, should be avoided because it disturbs, displaces, and isolates portions of Wēkiu bug habitat. However, as redesigned the impact would be lessened. It would likely require mitigation measures similar to those suggested for the Outrigger Telescopes project, such a habitat restoration.” Ex A-309 FEIS Vol. 3, Appendix K, p. 32.
607. In lieu of a habitat restoration plan, the TMT Project plan is to monitor arthropod activity in the vicinity of the portion of the Access Way that will impact Type 3 Wēkiu bug habitat. Ex A-308 FEIS, p. 3-73.
608. Alien arthropods can arrive at Project sites from localities on the Island of Hawai‘i where they are already established, or in crates, boxes, containers, or construction equipment that are shipped from off the Island. Ex A-308 FEIS, p. 3-75.
609. Invasive species, including spiders (*Lepthyphantes tenuis* and *Meriola arcifera*), and beetle (*Hippodamia convergens*) that compete with arthropods including the Wēkiu bug for food and may also prey on native species at the summit. Ex A-302

CMP NRMP, p. 2.2-36.

610. Non-indigenous arthropods may pose a threat to native species that are residents of the higher elevations of Mauna Kea through predation or as competitors for food resources. Ex A-309 FEIS Vol. 3, Appendix K, p. 19.
611. The Natural Resource Plan says the Invasive Species Rapid Response Plan in conjunction with Invasive Species Monitoring Plan should be in place for response to these species prior to detection, however the **Applicant stated that the plan is not in place.** (Emphasis added) Nagata Tr. 8.17.11 p 131: 1-11
612. “It is possible that the introduction of an alien invasive species may occur in any area impacted by the construction process, and such invasion would ultimately impact the entire alpine ecosystem.” DLNR Division of Forestry and Wildlife Administrator Paul J. Conry, in his CDUA Comments for the Thirty Meter Telescope wrote, on November 29, 2010, in response to 4.1.2 Natural Resource Management p. 4-13: Ex A-309 FEIS Vol II
613. Incremental habitat fragmentation, exacerbated by biotic challenges, puts small isolated species at further risk of extinction. Invasions of non-native weeds can further degrade an altered habitat and landscape. Predatory insects, and those feeding on the same food sources as the species at risk, can have rapid and devastating consequences. Invasive invertebrates are perhaps the greatest threat to native invertebrates in Hawaii, through competition, predation, habitat alteration, and parasitism. At the summit of Mauna Kea the greatest threat to the arthropod populations is the introduction of invasive arthropods that are adapted to alpine conditions. The potential of introduction of new invasive species to Hale Pohaku and the summit through the importation of goods from similar climates (such as astronomical equipment), construction equipment and fill, road grading equipment and gravel accidental transport on vehicles, clothing and equipment, and biological control agents. Ex A-302 NRMP 2.2, 4.2
614. Since 2005, several new alien predatory species that could adversely impact the Wekiu bug have been found, and Englund reported that alien ant species are the greatest potential threat in the summit area. ... Because of the predatory and social nature of ants, and because ants have caused the extinction and decline of native arthropods throughout Hawaii, both the endemic wolf spider (*Lycosa* sp.) and the Wekiu bug would be expected to precipitously decline if ants ever become established. (Englund Wekiu-Rep 12-9 p 29) Ex A- 309 FEIS Vol III

615. During the past ten years of current management, several invasive species of both plants and animals have been introduced. The CMP calls for the development of an Invasive Species Rapid Response Plan in conjunction with an Invasive Species Monitoring Plan for specific species considered the highest risks, but even these plans still do not exist. **Just as invasive species control and eradication permits for the Science Reserve are not yet in place; nor are they in place for the TMT.** (Emphasis added) Ward Tr. 9.30.11 p 74 18-25, p 75 1-7

616. To avoid alien species introduction, vehicular access from the lowlands to the summit would be limited. **Any increase in traffic to the summit would increase the risk of alien species being established on the summit.** (Emphasis added) Eiben, Tr. 8.18.11, p. 141: 2-14

B. Cultural Resources

HISTORIC DISTRICT, SITES, AND ASSOCIATED TRADITIONAL AND CULTURAL PROPERTIES OF MAUNA KEA

Mauna Kea Summit Region Historic District

617. In 1999, the Mauna Kea Summit Region Historic District (MKS RHD) was determined eligible for listing on the National Register. (Ex. A-28, FAIS-AP, p. 1-1)

618. The MKS RHD includes a concentration of significant historic properties that are linked through their setting, historic use, traditional associations, and ongoing cultural practices. The properties include shrines, adze quarry complexes and workshops, burials, stone markers/memorials, temporary shelters, historic campsites, traditional cultural properties, historic trails, and sites of unknown function. (Ex. A-8, S. Collins WDT, p. 3)

619. The proposed TMT project would be located within the Mauna Kea Summit Region Historic District (State Inventory of Historic Place #50-10-23-26869) which was determined by the DLNR - State Historic Preservation Division to be historically and culturally significant under all five criteria (A, B, C, D, & E) of the Hawai'i Register of Historic Places and Hawai'i Administrative Rules (§13-275) and under all four criteria (A, B, C, & D) of the National Register of Historic Places. (Ex. A-37, SHPD letter, p. 1)

620. The five criteria established for evaluating the significance of historic properties and assessing eligibility for placement on the National/Hawai'i Registers of Historic Places are:

- A) Associated with events that have made an important contribution to the broad patterns of our history;
- B) Associated with the lives of persons important in our past;
- C) Embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, or possesses high artistic value;
- D) Have yielded, or is likely to yield information important for research on prehistory or history;
- E) Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property, or due to associations with traditional beliefs, events or oral history accounts – these associations being important to the group’s history and cultural identity. (Ex. A-309b, FEIS, p. G-54)

621. The MKSRHD is significant under all four National Register criteria, and criterion “e” of the Hawaii Administrative Rules, Chapter §13-275-6. The district is significant under criterion “a” because of the presence of the Mauna Kea Adze Quarry Complex (a National Historic Landmark), which was used over a period of 500 years or more and the hundreds of shrines in and outside of the quarry. Both the quarry and the shrines are associated with broad patterns and events in Hawaiian prehistory. The district is significant under criterion “b” because of the association with several gods who may have been deified ancestors. These include Kukahau`ula, Lilinoe and Waiau. The sites in the adze quarry and many of the shrines embody distinctive characteristics of traditional Hawaiian stone tool manufacture by craft specialists and a distinctive type of shrine construction found in only a few other places in the Hawaiian Islands. These make the district significant under criterion “c.” Studies of the Mauna Kea Adze Quarry Complex and the on-going archaeological survey of the Mauna Kea Science Reserve have already made a significant contribution to our understanding of Hawaiian prehistory and history, and hold the potential to make even more contributions. The district is thus significant under criterion “d.” Finally, the district is significant under criterion “e” because of the presence of numerous burials and the hundreds of shrines which have been interpreted as evidence of a previously unknown land use practice in the form of pilgrimages to the summit of Mauna Kea to worship the gods and goddesses. (Ex. A-309b, FEIS, p. G-54)
622. SHPD has begun working on the nomination of the MKSRHD to the National Register of Historic Places. (Ex. A-28, FAIS-AP, p. 7-1)

623. SHPD has repeatedly stated that they consider the summit region to be a historic district in a number of letters regarding astronomy and astronomy-related projects (See, Don Hibbard letter to Dierdre Mamiya, April 24, 2002; Don Hibbard letter to Robert McLaren, January 10, 2001; Timothy Johns letter to Kenneth Kumor, October 26, 2000; Don Hibbard letter to Robert A. McLaren, May 3, 1999). (Ex. A-309a, TMT FEIS, p. 27)
624. With the recognition of the MKSRHD as eligible for the National Register there is now a single frame of reference that can be used in evaluating site significance for all of the historic properties on the top of Mauna Kea. (Ex. A-28, FAIS-AP, p. 7-2)
625. Per the Mauna Kea Historic Preservation Plan [2000] prepared by SHPD: Within the [Mauna Kea Summit Region] historic district, the significance of properties is not evaluated individually because the summit region as a whole is considered eligible for inclusion in the National Register. Instead, the required assessments consider how each newly or previously recorded property potentially affected by a project contributes to the significance of the historic district as a whole. (Ex. A-309b, TMT FEIS, p. G-55)
626. Pu‘u Kukahau‘ula State Historic Property (SIHP Site No. 50-10-23-21438) is a contributing component of the Mauna Kea Summit Region Historic District. (Ex. A-309b, TMT FEIS, p. G-55)
627. Prior to the historic period, there are no other known sites on the series of cinder cones, including Pu‘u Kukahau‘ula, that comprise the ‘summit’ of Mauna Kea with the single exception of a cairn (Site 50-10-23-21209). There is a virtual absence of archaeological sites on the very top of the mountain. (Ex. A-28, FAIS-AP, p. 6-4)
628. In the times of the ancestors, individuals such as *kahuna kuhikuhi pu‘uone* were consulted prior to constructing structures so as not to create a physical and/or spiritual disturbance, disconnection, or imbalance between man and his *akua*, and between man and his environment. As such, Kanaka Maoli, including the great *ali‘i* (chiefly) dynasties of the past, never built any *heiau* (temples) or large structures on the very summit because of it being *kapu* (sacred). (Ex. G-1, E. Flores WDT, p. 2)
629. The process of consultation with those recognized as the ancestral *akua* and *kupua* of Mauna a Wākea was not done by the Applicant and was also never done by any

- previous projects. Mo‘oinanea has affirmed that they did not get permission from the ancestral *akua* and *kupua* to build on their home. (Ex. G-1, E. Flores WDT, p. 2, 7
630. Consideration of the properties included within the MKSRHD, and their associated practices and beliefs, suggests it to represent a type of historic property best referred to as a “**cultural landscape**”. A cultural landscape is a geographical definable area that clearly reflects patterns of occupation and land use over a long time period, as well as the cultural values and attitudes which guide and regulate human interaction with the physical environment. [Emphasis in bold] (Ex. A-21, App. N, p. 45)
631. This “cultural landscape” has been determined eligible for the National and State Register of Historic Places under multiple criteria including cultural significance to the native Hawaiian People (cf. letter of D. Hibbard to R. Evans, September 12, 1991). As a result, archaeologists with DLNR-SHPD have referred the summit region of Mauna Kea as a “**ritual landscape**” with all of the individual parts contributing to the integrity of the whole summit region. [Emphasis in bold] (Ex. A-21, App. I, p. 3)
632. Based on the Native Hawaiian traditional cultural practices and beliefs associated with Mauna Kea, as documented in the Maly (1999) oral history and consultation study, the MKSRHD could perhaps even more appropriately be considered a special type of cultural landscape referred to by the National Park Service as ethnographic landscapes: “those landscapes imbued with such intangible meanings that they continue to be deemed significant or even sacred by contemporary people who have continuous ties to the site or area”. (Ex. A-21, App. N, p. 45)
633. Such an ethnographic landscape would seem to be embodied in the concept of “cultural attachment” use by Maly (1999:27) to describe the connection of many Native Hawaiians to Mauna Kea. (Ex. A-21, App. N, p. 45)
634. “*Cultural Attachment*” embodies the tangible and intangible values of a culture. It is how a people identify with and personify the environment (both natural and manmade) around them. Cultural attachment is demonstrated in the intimate relationship (developed over generations of experiences) that a people of a particular culture share with their landscape--for example, the geographic feature, the natural phenomena and resources, and traditional sites, etc., that make up their surroundings. This attachment to environment bears direct relationship to their

- beliefs, practices, cultural evolution, and identity of a people. In Hawai`i, cultural attachment is manifest in the very core of Hawaiian spirituality and attachment to landscape. The creative forces of nature which gave birth to the islands (e.g., Hawai`i), the mountains (e.g. Mauna Kea) and all forms of nature, also gave birth to *na kanaka* (the people), thus in Hawaiian tradition, island and human kind share the same genealogy...” (Ex. A-21, App. I, p. 27)
- 635.OMKM retained Pacific Consulting Services, Inc. [PCSI] to conduct archaeological inventory surveys on Mauna Kea, primarily the Mauna Kea Science Reserve [MKSR], secondarily the Hale Pohaku area, and the access road portion. (S. Collins, Tr. Aug. 17, 2011, p.13:24-25, 14:1-5)
- 636.According to S. Collins, senior archaeologist for PCSI, “...**survey work was not conducted in support of the TMT**. We conducted the survey work as survey work, so any reassessments we made of that site was based on our work and **not based on TMT**.” [Emphasis in bold] (S. Collins, Tr. Aug. 17, 2011, p.39:16-20)
- 637.A viewplanes analysis of the visual impacts upon the historic properties in the Historic District was not done by PSCI for the TMT Project. (S. Collins, Tr. Aug. 17, 2011, p.54:17-21)
- 638.The viewplanes and their significance of these sites within the area of the TMT Project was unknown to the senior archaeologist, S. Collins. (S. Collins, Tr. Aug. 17, 2011, p.37:22-25)
- 639.Effects on the historic district would consider the visual impact of a facility on the surrounding landscape (i.e., the various land forms creating the setting and context of the multiple historic properties encompassed by the district) and on those individual historic properties that contribute to the significance of the district. (Ex. A-28, FAIS-AP, p. 8-2)
- 640.The CDUA inaccurately stated that, “The TMT Observatory will appear in the view directly toward the summit from **only a few of the shrines** on the northern plateau.” (Emphasis added) (Ex. 311, CDUA, p. 7-13)
- 641.There are numerous historic properties and cultural resources (find spots) on the northern plateau that have been identified in the Archaeological Inventory Survey of the Mauna Kea Science Reserve (AIS-MKSR). (Ex. A-28, AIS-MKSR, p. 3-12)

642. According to J. Hayes, a viewshed analysis was not done from these historic properties and cultural resources on the northern plateau. (J. Hayes, Tr. Aug. 16, 2011, p. 67:8-20)
643. Figure 3.7 of the archaeological inventory survey conducted by PCSI identified the locations of historic properties, traditional cultural properties, and find spots in the MKSR. (Ex. A-28, FAIS-AP, p. 3-12)
644. The amount of data obtained in the surveys was overwhelming when compared to most archaeological surveys in Hawai'i. This has limited the data analyses that could be undertaken to the shrines and selected artifact assemblages from the Pohakuloa Gulch quarry-workshop site complex. Also, due to the large number of artifacts, the number of analyzed attributes is also limited in number. (Ex. A-133, DAIS-MKSR, p. i)
645. The largest concentration of historic properties and cultural resources is on the northern slope of Mauna Kea below the summit cones. (Ex. A-28, FAIS-AP, p. 6-1)
646. Many of these sites are located within a narrow 220-ft contour interval, between the 12,900-ft and 13,100-ft elevations on the northern slope. (Ex. A-28, FAIS-AP, p. 6-1)
647. A total of 263 historic properties were identified in the archaeological survey of the MKSR. (Ex. A-133, DAIS-MKSR, p. i)
648. The 260-some historic properties identified, evaluated, and tabulated in surveys for OMKM are considered to be contributing factors to the MKSRHD. (S. Collins, Tr. Aug. 17, 2011, p. 60:4-7)
649. A total of 141, or 54%, of these historic properties were classified as shrines by PCSI. (Ex. A-311, CDUA, p. C-3)
650. The term 'shrine' is used by Archaeologist [McCoy] to describe all of the religious structures that exist in the summit region of Mauna Kea. (Ex. A-21, App. N, p. 21)
651. Most of the shrines found on Mauna Kea have 1 to 3 uprights. However, some have as many as 24 or 25 stone uprights. (Ex. A-21, App. N, p. 21)

652. Shrines were placed in prominent location with commanding views of the landscape. (Ex. A-21, App. N, p. 21)
653. There are 29 historic properties with a total of 48 features recorded in the MKSR that are interpreted as *Burials or Possible Burials*. (Ex. A-133, DAIS-MKSR, p. 5-44 & 5-45)
654. Although there are known burials in the MKSR, a burial treatment plan has not been prepared even though it has been recommended in PSCI's survey report. (S. Collins, Tr. Aug. 17, 2011, p. 45:11-18)
655. PSCI's recommendation as part of the Cultural Resources Management Plan (CRMP): Section 4.3.2: In view of the documented existence of human burials in the Science Reserve there is a need to develop a burial treatment plan (BTP) to protect all known burial sites. Given the possibility that more human remains will be found inadvertently in the Science Reserve in the future there is also a need to develop an Inadvertent Discovery Plan. (Ex. A-28, FAIS-AP, p. 8-2)
656. Expert Witness Dr. J. Kehaulani found no TMT documents that address Native Hawaiian Burial concerns. (Kauanui, Tr. August 25, 2011, p. 104:1-4)
657. OMKM Interim Director Nagata stated that OMKM has not initiated a burial treatment plan. (Nagata, Tr. 8.18.11 p. 52:14-20)
658. A burial treatment plan for known burials does not exist, nor does an inadvertent discovery plan. (Ex. A-301, page 7-56)
659. Mauna Kea is a burial ground of our highest born and most sacred ancestors. (Ex. F-2, p. 9)
660. The functions of 15 historic properties recorded in the MKSR are listed as *Stone Markers/Memorials*. (Ex. A-133, DAIS-MKSR, p. 5-46 & 5-47)
661. One of the more ambiguous classes of sites are piles or stacks of rocks believed to be markers of some kind or memorials to a person or event. In all but a couple of cases, the actual function is unclear. (Ex. A-133, DAIS-MKSR, p. 5-46)
662. A 1997 SHPD reconnaissance survey began the process of recording what were initially referred to as "locations" but are now being termed "find spots" – a general term referring to man-made remains that are either obviously modern features or features that cannot be classified by archaeologists with any level of

- confidence as historic sites because of their uncertain age and function. (Ex. A-28, FAIS-AP, p. 3-10)
663. “Find spots” are cultural resources. (Ex. A-28, FAIS-AP, p. 5-20)
664. Cultural resources in the MKSR need to be considered in developing appropriate management strategies. (Ex. A-311, CDUA, p. C-4)
665. A total of 339 cultural resources (“find spots”) were recorded in the MKSR. (Ex. A-133, DAIS-MKSR, p. ii)
666. The functions of the vast majority (over 250) of these find spots recorded in the MKSR are listed as *Markers*. (Ex. A-133, DAIS-MKSR, Appendix E)
667. The functions of over 65 of these find spots recorded in the MKSR are listed as *Unknown*. (Ex. A-133, DAIS-MKSR, Appendix E)
668. Only about 25 of these find spots recorded in the MKSR have been identified as potentially being modern features. (Ex. A-133, DAIS-MKSR, Appendix E)
669. Some of the find spots could not be definitely dated and could possibly be over 50 years in age and would instead be classified as historic properties. (Ex. A-37, SHPD letter, p. 1)
670. It is highly likely that some of these find spots are actually historic properties, but to demonstrate this would require a more detailed analysis of their morphology and location. (Ex. A-133, DAIS-MKSR, p. ii)
671. Some of the find spots appear to be religious sites to archaeologist, S. Collins. (S. Collins, Tr. Aug. 17, 2011, p.57:3-11)
672. Some of the find spots may also be associated with ongoing religious practices, but their function is ambiguous or unclear in most cases to archaeologist, S. Collins. ((Ex. A-8, S. Collins DWT, p. 7)
673. In August 2005, PCSI was contracted by OMKM to undertake an archaeological inventory survey of the Astronomy Precinct, located within the MKSR. (Ex. A-28, FAIS-AP, p. 1-1 & 1-3)

674. The archaeological field survey crew for the Astronomy Precinct and surrounding lands was limited to PSCI co-principal investigators, Patrick McCoy and Dennis Gossler, and staff, Richard Nees and Reid Yamasato. (Ex. A-28, FAIS-AP, p. 1-4)
675. This field survey crew did not include any Native Hawaiian cultural practitioners. (Ex. A-28, FAIS-AP, p. 1-4)
676. The CDUA referenced 4 historic properties in the vicinity of the TMT Observatory, 2 historic properties in the vicinity of the Batch Plant, and 6 historic properties in the Hale Pohaku area. (Ex. A-311, CDUA, p. 4-1, 4-3, 4-5)
677. In the CDUA, the Applicant downplayed the impact of the TMT Project upon historic properties and cultural resources by limiting the discussion to Area E of the Astronomy Precinct instead of the MKSR as a whole. (Ex. A-311, CDUA, p. 4-1)
678. The accurateness of Figure 4.1: Historic Properties in the Vicinity of the TMT Project Areas that was submitted as part of the CDUA is uncertain. There appears to be some alteration and elimination of significant information from this figure. (A-311, CDUA, p. 4-2)
679. Although the source for this figure is identified as Pacific Consulting Services Inc. (2010), S. Collins of PCSI stated, "We would not have had the TMT info on our original figure. I believe that's been added to this one since you attained it from the CDUA." (Ex. A-311, CDUA, p. 4-2; S. Collins, Tr. Aug. 17, 2011, p. 33:4-9)
680. Site 16169 was identified in the FAIS-AP as a shrine with a single row of two uprights. (Ex. A-28, FAIS-AP, p. 5-11, 5-12)
681. Site 21447 was identified in the FAIS-AP as a shrine with a single upright. (Ex. A-28, FAIS-AP, p. 5-14)
682. Important information these historic properties -- SHIP No. 16169 and No. 21447 -- within the Mauna Kea Astronomy Precinct was specifically omitted from the direct written testimony of S. Collins. (Ex. A-8, S. Collins DWT; S. Collins, Tr. Aug. 17, 2011, p.36:14 & 19-21)
683. PCSI assigned the function of *Marker* to cultural resources Nos. 1997.07, 2005.03, 2005.05, & 2005.09 that were described as stacked rocks. (Ex. A-28,

FAIS-AP, p. 5-20)

684. PCSI assigned the function of *Unknown* to cultural resources Nos. 2005.06, 2005.07, & 2005.08 that were described as upright(s). (Ex. A-28)
685. The confidence level of archaeologists in assigning functions to many of the sites and component features varies. (Ex. A-28, FAIS-AP, p. 4-4)
686. “No universally accepted definitions of site and feature exist in Hawaiian archaeology, and it is unlikely that any ever will because of the architectural complexities of the archaeological landscape in many areas of the Hawaiian Islands, and the different perspectives that archaeologists hold on how the archaeological landscape should be observed and recorded.” (Ex. A-28, FAIS-AP, p. 4-3)
687. “While sites and features can be easily described in terms of formal attributes, there is in reality no dichotomy between form and function, since function is inferred from form,…” (Ex. A-28, FAIS-AP, p. 4-3, 4-4)
688. Archaeological classifications are not immutable. They may require revision. (Ex. A-28, FAIS-AP, p. 4-3)
689. Regarding the classification of sites, S. Collins stated, “We did re-evaluate at least one or two sites that we thought might be recent ones, and upon further study we determined they were historic in age. It's not hard and fast. ... So as best we can, we try to make these calls and we try not to make them unless we're reasonably certain. (S. Collins, Tr. Aug. 17, 2011, p. 86:7-20)
690. Due to the uncertainty of archaeologists, a number of sites in the MKSR have not been accurately identified and/or their functions are listed as *Unknown*. (Ex. A-133, DAIS-MKSR, Appendix E)

Mauna Kapu (Sacred Mountain)

691. It is known that Mauna Kea has long been regarded by many native Hawaiians as the most sacred place on the island, and it has been, and continues to be used as a place to conduct traditional and customary practices. Cultural and religious practices associated with the mountain include prayer, burial, and other rituals, and construction of small shrines. (Ex. A-304, MKPAP, p 2-24)

692. “And what do you suppose is the mountain of vision?...It is Mauna Kea, the most sacred mountain in all of Polynesia...The entire mountain is a temple, a heiau and the mountain itself is kapu—sacred...the scientists didn’t know this when they built their telescope on the mountain’s summit. Nor did they ask permission to do so from the caretakers of that sacred place, and the mountain does have kahus. Yet we cannot be too hard on the scientist, for they were simply operating from a place of ignorance, a place of theory, and they are just passing through.” (Ancestral wisdom uttered by Hawaiian Shaman, Elder and Teacher, Hale Kealohalani Makua, in the book titled; “The Bowl of Light”, by Hank Wesselman, Ph.D., p. 192)” (Ex. G-2 (B. Pualani Case) WDT, p. 1)
693. The *inoa* (name) of **Mauna a Wakea** literally means, "Mountain of Wakea". This name is also reverberated by the ancestral guardians connected to this sacred mountain. Wakea (Sky Father) is personified in the atmosphere and heavenly realm that envelops Papahānaumoku (Mother Earth). This mountain is also referred to as “Mauna a Kea”, “Mauna Kea”, or just “Wakea”. (Ex. G-1, E. Flores WDT, p. 1)
694. “Mauna Kea is now widely regarded by some as not only a sacred place, but the most important of all of the sacred places on the island of Hawai’i.” (Ex. A-303 CMP CRMP, p. 4-12)
695. “It is clear that to many Hawaiians, Mauna Kea is more than a mountain; it is the embodiment of the Hawaiian people.” (Ex. A-301 CMP, p. 1-1)
696. Revered by Hawaiians for centuries, Mauna Kea remains a place of significant worship for Hawaiians, as well as non-Hawaiians. (Ex. A-301 CMP, p. 5-24)
697. “Some contemporary Native Hawaiian cultural practitioners continue to view Maunakea as the first-born of the Wākea and Papa union and, thus, revered as a connection to all Native Hawaiian people and gods.” (Ex. A-308, FEIS Vol. 1, p. 3-13)
698. The summit region of Mauna Kea “...is also by any standard of comparison one of the most culturally significant and archaeologically important places in the Hawaiian Islands. A number of Native Hawaiians regard Mauna Kea as the most sacred place on the island and some use the mountain as a place to conduct traditional and customary practices.” (Ex. A-28, FAIS-AP, p. 1-1)

699. The physical prominence of Mauna Kea as well as its stationing nearest to the heavens holds a spiritual significance for the Hawaiian people, a significance that can be expressed in likening the mountain to a sacred alter. (Ex. A-301, CMP, p. 1-3)
700. For some Hawaiians, Mauna Kea is so revered that there is no desire to ascend it, no desire to trespass on what is considered sacred space. Simply viewing the tower, the mountain, from afar, both affirms its presence, and reaffirms the sense of connection with both place and personage. For this reason, many Hawaiians feel that activities on Mauna Kea that lead to visible alterations of the landscape not only have a significant effect on the mountain itself, but also have a damaging effect on everything and everyone that is physically, genealogically, spiritually and culturally tied to Mauna Kea. (Ex. A-301, CMP, p. 1-4)
701. The origins of Maunakea and its central place in Hawaiian genealogy and cultural geography are told in *mele* (poems, chants) and *mo`olelo* (stories and traditions). Native Hawaiian traditions state that ancestral akua (gods and goddesses, deities) reside within the mountain summit area. Several natural features in the summit region are named for, or associated with, Hawaiian akua; these associations indicate the importance of Maunakea as a sacred landscape. Each part of the mountain contributes to the integrity of the overall cultural, historical and spiritual setting. (Ex. A-309, FEIS, p. 3-11)
702. As a result of its prominence, isolation, and extreme environmental conditions Mauna Kea's place in the culture and history of the Hawaiian people is significant. This "cultural significance" extends beyond a physical setting, sites or particular features which have been previously identified in archaeological site studies. Mauna Kea is a prominent feature on the cultural landscape of Hawai'i which has been and continues to be viewed from afar, and to which spiritual and cultural significance is attributed. (Ex. A-21, App. I, p.3)
703. Mauna Kea is an 'ahu, heiau, or a temple of supreme order, and the reason for that is because it was created in the first time of our chant of our creation when akua gave birth to the aina, and codified the laws of aloha in the land. (TR. K. Pisciotto, September 26, 2011, p. 35:13-21)
704. It's not a normal temple. It is a temple made by the heavens for man to learn the ways of the heavens. The ways of the heavens means the way we live in creation and with creation, and live and walk on the earth. (TR. K. Pisciotto, September 26, 2011, p. 36: 1-12)

705. Codified in that landscape are not only the alignments and relationship to the heavens, the constellations and the stars, but also the wisdom of the ages. Even the chants remain in the rocks and stones. (TR. K. Pisciotto, September 26, 2011, p. 36: 1-12)
706. Native Hawaiian traditions state that ancestral *akua* (gods, goddesses, deities) reside within the mountain summit area. These personages are embodied within the Mauna Kea landscape – they are believed to be physically manifested in the earthly forms as various *pu`u* and as the waters of Waiau. Because these *akua* are connected to the Mauna Kea landscape in Hawaiian genealogies, and because elders and *akua* are revered and looked to for spiritual guidance in Hawaiian cultural, Mauna Kea is considered a sacred place. (Ex. A-23, p. 5-3)
707. “The upper regions of Mauna Kea reside in Wao Akua, the realm of the Akua-Creator. It is also considered the Temple of the Supreme Being and is acknowledged as such in many oral and written histories throughout Polynesia, which pre-date modern science by millennia.” (Ex. F-2, p.1)
708. “It is home of Na Akua (the Divine Deities), Na 'Aumakua (the Divine Ancestors), and the meeting place of Papa (Earth Mother) and Wakea (Sky Father) who are considered the progenitors of the Hawaiian People. Mauna Kea, it is said, is where the Sky and Earth separated to form the Great-Expanse-of-Space and the Heavenly Realms. Mauna Kea in every respect represents the zenith of the Native Hawaiian people's ancestral ties to Creation itself.” (Ex. F-2 p.1)
709. Poli‘ahu, “*ka wahine i ke kapa hau*” (the woman in the mantel of snow), is at times referred to as an *akua wahine*. She is a part of Mauna a Wakea and creates the rain, snow, hail, and sleet on this mountain. She serves as caretaker and guardian for the mountain and grants permission to certain spirits coming to the mountain. Poli‘ahu has two attendants assisting her, Lilinoe and Lihau. She is a part of the landscape features with a highly evolved consciousness. Both oral and written native Hawaiian traditional accounts have documented Poli‘ahu’s connection to Mauna a Wākea. (Ex. G-1, E. Flores WDT, p. 5)
710. Mo‘oinanea, *mo‘o wahine* and guardian of Lake Waiau, is at times referred to as a *kupua*. She was born on the summit of Mauna a Wākea and assumed the responsibility as guardian of Lake Waiau from her mother, Melemele, who was the former guardian of this sacred body of water. Assisting Mo‘oinanea are her two female *mo‘o* attendants, Kīpu‘upu‘u and Kupukupu as well as others,

including spirit attendants. Some serve as guards who watch the whole mountain while her attendants watch the lake when she is gone. Mo‘oinanea also serves as counselor to Poliahu and assists with some of her problems. Her genealogy includes both *mo‘o* ancestry as well as human ancestry. Mo‘oinanea is a revered and significant figure in both oral and written native Hawaiian traditional accounts that have documented her connection and genealogical ties to Mauna a Wākea. She is able to communicate with individuals who have the cultural sensitivity and ‘gift’ to see, hear, and interact with her. (Ex. G-1, E. Flores WDT, p. 5-6; Ex. G-2, B. Case WDT, p. 3)

711. Kanaka Maoli ancestors knew and had an unwavering connection with the ancestral *akua* that are Poliahu, Kukahau‘ula, Lilinoe, Mo‘oinanea, and Kane. To them, the essence of the mountain truly resided in these spiritual beings. They also believed in the divine *mana* or power that these *akua* possess which is the same *mana* that Mauna Kea houses. (Ex. G-4, H. Rios WDT, p. 1-2)
712. There are a number of guardian forces of nature connected to Mauna a Wakea. In a ceremony conducted by members of the Flores-Case ‘Ohana on the summit on 8 May 2011, a guardian force of nature from the depths of Mauna a Wākea came forth to provide the following insight. He is a guardian who came from the very depths of the mountain, way below the crust of the ocean floor, one who carries the ancient knowledge. He was filled with sadness because of the observatories on her (the mountain’s) shoulders and breasts were causing such desecration. He was aware of her feelings because they are all connected. Other guardians on the mountain have been awakened and are on alert regarding this proposed development. They are all in full communication with the Creator who can see all things through Wakea. He declared that those who are planning to cause further desecration on Mauna a Wākea are "ignorant and lost". In addition, he explicitly stated a message to them, "You are responsible for what you do not know and you will be held responsible." He also mentioned that everyone is accountable for one’s own actions. Furthermore, he emphasized that, "You don’t know what is coming when you do this, you have been warned." He is the one who has the power to shake the earth. (Ex. G-1, E. Flores WDT, p. 5)
713. Mauna a Wakea is where Poli‘ahu and other ancestral *akua*, *‘aumakua*, and *kupua* connect with Ke Akua (The Creator). It is so high, the point on the top that they put their hands up to connect to the heavens. They wish to have no other observatories on the mountain for if they continue to build, some spirits might have to move off mountain. Other spirits will not come up there because they had

- to move. (Ex. G-1, E. Flores WDT, p. 7)
714. “Mauna Kea is ‘*ka piko o ka moku*,’ which means ‘Mauna Kea is the navel of the island.’ ... When we understand the three *piko* of the human anatomy, we may begin to understand how they manifest in Mauna Kea. Mauna Kea as the fontanel requires a pristine environment free of any spiritual obstructions.” (Ex. A-301, CMP, p. i-ii)
715. Sacred mountains such as Mauna a Wakea, due to their geological composition and extreme height, are a *piko* (portal) that allows for the transference of energy from one source to another. This understanding is reflected in the traditional Hawaiian concept of the “triple *piko*” of a person. In essence, the *piko* on the summit of the mountain is comparable to the *piko* located on the tops of one’s head at the fontanel. It is this *piko* where energies and life forces flow from Ke Akua (The Creator) and higher dimensions into the Earth in a similar manner that life forces flow into one’s body through the *piko* on the head. (Ex. G-1, E. Flores WDT, p. 7-8)
716. Mauna a Wākea anchors a very complex multi-dimensional over-fold, and does so through its very conscious geometric grid, complex frequencies, and unique electromagnetic field. The summit is also an area where vortexes of energy occur. Vortexes distribute energy outward in what is termed electrical vortexes, and inward in what is termed magnetic vortexes. Mauna a Wakea is an inward and outward vortex-portal complex. (Ex. G-1, E. Flores WDT, p. 8)
717. Mauna a Wākea also resonates in harmonic oscillation with Mount Shasta in California, Mount Fuji in Japan, and other specific mountains around the world. Due to these energetic connections between these mountains, impacts upon Mauna a Wākea also impacts other mountains and vice versa. (Ex. G-1, E. Flores WDT, p. 9, Ex. G-9, p. 1)
718. There are countless mountains around the world considered sacred by cultures past and present. These holy mountains are also keystones to indigenous religions that regarded these areas as the abodes of certain gods, goddesses, deities, divine beings, natural forces, and spirits. In addition, pilgrimages to sacred mountains have been taking place for thousands of years. Whether it is Mauna a Wakea, Mount Shasta in California, Mount Fuji in Japan, Mount Teide in the Canary Islands, or Mount Sagarmāthā (Everest) in Nepal, their sacredness has resonated from centuries past. (Ex. G-1, E. Flores WDT, p. 3)

719. Sages and seers from antiquity have repeatedly remarked that the dimension one sees with their physical eyes is not the only dimension of existence. Many other realms exist and within them a variety of beings, spirits, energies and entities. Traditional peoples the world over have spoken of the existence of these presences. Shamanic practitioners communicate with the spirits of animals, ancestors, and the plant world. Psychics, clairvoyants and mediums are able to communicate with entities from 'non-visible' realms. Religious mystics affirm the presence of angels, deities and other heavenly beings. It is certain that something is happening in dimensions other than those perceptible by one's normal senses of sight, hearing, touch, and smell. These presences seem to be especially concentrated at the power places and sacred sites such as Mauna a Wākea. (Ex. G-1, E. Flores WDT, p. 10-11)

Wai Kapu (Sacred Water Elements)

720. The three pu'u, Poli'ahu, Lilinoe and Waiau are named for three sister goddesses who are female forms of water. Poli'ahu is embodied in the snow, Lilinoe in the mist, and Waiau in the lake. (Ex. A-21, App. N, p. 25)

721. The snow, ice, and water elements are divine manifestations of the different deities. We believe it is very important that the deities not be negatively impacted. (Ex. C-1, Pisciotto WDT, p. 8)

722. Lake Waiau is believed to contain pure water associated with the god Kane and was used in healing and worship practices. (Ex. A-21, App. N, p. 20)

723. Lake Waiau is also home to our akua (deities), such as Mo'oinanea, who is recorded in our genealogies and who is assigned to care for the *kupua* children. (Ex C-1, Pisciotto WDT, p. 8)

724. Lake Waiau is a very important cultural and religious site on Mauna Kea. The lake represents many things to the Hawaiian People and to many others as a beautiful, unique and special place. (Ex. C-1, Pisciotto WDT, p. 8)

725. Lake Waiau is considered among other things to be a doorway into the Po (the Heavenly Realms of the Ancestors). It is said this is the water of the sea and the water of the sky meet. (Ex C-1, Pisciotto WDT, p. 8)

726. Lake Waiau is like a navigational gourd to view the heavens in, as the stars are reflected on its surface. (Ex C-1, Pisciotto WDT, p. 8)

727. The snow, ice, and waters of Lake Waiau (or other pooling water areas, like those that occur on Pu`u Pohaku) are very valued because they are gathered for medicinal and other ceremonial uses and purposes. (Ex C-1, Pisciotta WDT, p. 8)
728. Traditional Hawaiian water uses are part of how watershed lands that now are called Conservation Districts are originally established. (Ex C-1, Pisciotta WDT, p. 8)
729. Our traditions tell us the waters we swim in at Hilo Bay are from Mauna Kea. The water of Mauna Kea even feed our fish ponds below. (Ex C-1, Pisciotta WDT, p. 8)
730. The University's assertions that there will be no impact are not sustained by actual data. There have been no comprehensive studies of the complex hydrology of Mauna Kea. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 8
731. 'We have long had concerns for the protection of all of the waters of Mauna Kea, including concern over any possible contamination of our drinking water, as Mauna Kea feeds as many as five aquifers around the island. We have concerns also because the batch plant areas have water features (run-off channels) that flow in the direction of the lake. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 8
732. We cannot harvest water, ice or snow for medicine if these properties are contaminated. There is uncertainty and that immediately affects our ability to continue some practices now. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 8.
733. The Public Trust Doctrine does not allow for the excessive taking of any of the commons (i.e. land, water, air etc.). The Public Trust Doctrine and the Constitution provide for the protection of Native Hawaiian Traditional and Customary cultural and religious practices and ensure that all people have a clean and healthful environment... Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 8
734. BLNR has an affirmative duty to protect these things and that in the absence of conclusive evidence to the contrary they must apply the precautionary principle, which is to err on the side of caution and for the protection of the resources. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 8

735. In this case there is no conclusive evidence that the complex hydrology of Mauna Kea, the islands drinking water sources and the important water sources of Mauna Kea will not be affected. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 9.

736. We also heard two witnesses, Dr. Kawika Liu and Kehaulani Kauanui who testified that the University and the Corporation did not even consider, let alone analyze the impacts resulting from highly destructive development upon the landscape on the health and well-being of Native Hawaiian people, and especially those with high cultural affiliations, such cultural practitioners. The landscape of Mauna Kea is a historic, cultural and ritual landscape. (TR. Kealoha Pisciotta, September 30, 2011, p.135:14-22)

737. The University's admission regarding the substantial, significant and adverse impacts that the development has had and will continue to have if the TMT is built to the cultural and natural resources of the Mauna Kea Conservation District means that the regulatory constraints or limits regarding impacts to resources have already been met, and to allow further impacts would cause these limits to be exceeded. (TR. Kealoha Pisciotta, September 30, 2011, p.135:25, 136:1-7)

VIEWPLANE AND VISUAL IMPACTS

738. Effects on the historic district would consider the visual impact of a facility on the surrounding landscape (i.e., the various land forms creating the setting and context of the multiple historic properties encompassed by the district) and on those individual historic properties that contribute to the significance of the district. (Ex. A-28, FAIS-AP, p. 8-2)

739. The Pu'u Kukahau'ula State Historic Property has been massively impacted by the construction and use of the existing loop access road, telescope pads and appurtenances. These impacts include not only effects to the cinder cone itself but also to the surrounding view plane. (Ex. A-309b, TMT FEIS, p. G-57).

740. [T]he visual impact of past actions on Maunakea, such as the 11 observatories currently located within the Astronomy Precinct, is considered substantial, significant and adverse. When the TMT Observatory is combined with the existing conditions, the cumulative visual impact of development on or near the summit of Mauna kea will continue to be significant... Ex. A-309 (TMT FEIS Section 3.5 Visual and Aesthetic Resources), p 3-101.

741. The TMT Observatory will add a new visual element to the northern plateau area that will be visible to varying degrees from the shrines along the northern slopes of Maunakea. Ex. A-309, (TMT FEIS Section 3.2 Cultural Resources), p. 3-31
742. There are no TMT Project visual impacts if the TMT project is not built under the No Build Alternative. (Ex. A-27, VIATR, p. 55)
743. The Applicant concedes that when the TMT Observatory is combined with the existing conditions, the cumulative visual impact of development on or near the summit of Mauna kea will continue to be significant. Ex A-308 FEIS Section 3.5 Visual and Aesthetic Resources p 3-101.
744. The TMT observatory and appurtenances will be visible to the west and north of the Pu‘u Kukahau‘ula State Historic Property. (Ex. A-309b, TMT FEIS, p. G-57)
745. [T]he TMT does not preserve or improve upon the open space and natural beauty characteristics of Mauna Kea, nor does it demonstrate it will not have an adverse or significant impact on the cultural resources of Mauna Kea. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 9
746. The TMT Observatory will impact the view plane in certain portions of the Pu‘u Kukahau‘ula State Historic Property (SIHP # 50-10-23-21438) and the Mauna Kea Summit Region Historic District (SIHP # 50-10-23-26869). (Ex. A-309b, TMT FEIS, p. G-62)
747. Effects on the historic district would consider the visual impact of a facility on the surrounding landscape (i.e., the various land forms creating the setting and context of the multiple historic properties encompassed by the district) and on those individual historic properties that contribute to the significance of the district. (Ex. A-28, FAIS-AP, p. 8-2)
748. Viewplanes, viewscales are public trust resources too. Viewplanes, viewscales and open spaces are also traditional cultural properties. The TMT being placed in the middle of the ring of shrines contain hundreds if not thousands of sites on the northwestern flank of the summit plateau will be impacted because the views used in ceremonies will be blocked in very significant ways. (TR. Kealoha Pisciotta, September 30, 2011 p.138:19-25, 139:1)
749. If we are standing at ground level on the south side of the TMT on the plateau from any of the ahu's or cultural, historic sites looking northward, we will not be

- able to see Haleakala, as we saw during the site visit, nor any of the other islands in the chain which views are used in some ceremonies, nor will we be able to observe the motion of the northern stars or constellations without direct interference from the TMT, as the height alone is too high. (TR. Kealoha Pisciotta, September 30, 2011, p. 139:2-11)
- 750.If you're standing at ground level on the east side, we will not be able to see or observe the motion of the western stars or constellations without direct interference from the high reaching TMT. (TR. Kealoha Pisciotta, September 30, 2011, p.139:12-15)
- 751.[I]f you're standing on the ground level on the west side at any of the sites, you will not be able to see or observe motions of the eastern stars or constellations without direct interference from the TMT. (TR. Kealoha Pisciotta, September 30, 2011, p. 139:16-20)
- 752.[I]f you're standing on the ground level north of the TMT on the plateau from any of these sites, you will not be able to see or observe the motion of the sun and stars or constellations without direct interference from the TMT. (TR. Kealoha Pisciotta, September 30, 2011, p.139:21-25)
- 753.[T]here are no more 360-degree views. Views are limited to where and however anyone can get around the observatories to find an open space. (TR. Kealoha Pisciotta, September 30, 2011, p. 138:1-4)
- 754.From the pu'u level. Many of the pu'u are considered traditional cultural properties in the Cultural Impact Assessments and studies. They are important as they are often burial sites, places where water, pooling water is collected. And because ceremonies are performed on or from them, many practitioners, including myself, conduct ceremony on the top of Pu'u Poli'ahu.
(TR. Kealoha Pisciotta, September 30, 2011, p.140:1-8)
- 755.From the summit pu'u's. We specifically asked on the site visit to go to those locations on the north-facing side of the summit to demonstrate how much of an impact that will be from over there. As we said earlier, we have to move already around the telescope, so taking away even that viewplane adds even more injury.
(TR. Kealoha Pisciotta, September 30, 2011, p.140:13-19)
NOTE: Please see also, questions from Hearing Officer to Witness Kealoha Pisciotta, TR. September 26, 2011, p.101:21-25, 102:1-25, 103:1-25, 104:1-3

- 756.[W]hen we speak of alignments being blocked, it means we cannot do ceremony in the way that we need to be a part of those alignments, because we are -- they are being physically and spiritually blocked. That in turn interrupts our ability to perform those ceremonies and other cultural practices. p.141:11-17
- 757.The University also fails to analyze the view sheds from the `ahu's on the plateau. The TMT will be the most dominate feature on the plateau, and it will impact most view planes from the `ahu themselves situated on the plateau. (WDT, Kealoha Pisciotta, June 28, 2011, p. 14
The natural beauty is marred with the industrial buildings, and cultural practitioners and the public have to shift and adopt their practice to find a clear path for their traditional and cultural and religious practices. (TR. Kealoha Pisciotta, September 30, 2011, p.138:5-9
- 758.There would be another eyesore and 'pimple' on the mountain to create an adverse visual impact upon this sacred landscape if the TMT Project is approved. (Ex. G-1, E. Flores WDT, p. 10).
- 759.Currently in the "submillimeter valley" are the eight (8) 6 meter telescopes. These lay between Kukuahuula and Puu Poliahu. Exh A-313 Staff Report Feb 25, 2011, p.6-7.
- 760.The TMT Project would be a significant visual impact when seen from the front portion of the Flores-Case 'Ohana home, interfering with their customary cultural and religious practices, including but not limited to prayers that are directed towards this sacred mountain. (Ex. G-1, E. Flores WDT, p. 10)
- 761.A viewplanes analysis of the visual impacts upon the historic properties in the Historic District was not done by PSCI for the TMT Project. (S. Collins, Tr. Aug. 17, 2011, p.54:17-21)
- 762.The viewplanes and their significance of these sites within the area of the TMT Project was unknown to the senior archaeologist, S. Collins. (S. Collins, Tr. Aug. 17, 2011, p.37:22-25)
- 763.When we go to practice on Mauna Kea, we don't only go to the summit, as the Applicant contends. Practices are dependent on the reason the ceremony is being conducted, and the hundreds of cultural and historic shrines placed around the

summit region demonstrate practice is wide spread. (Tr. Kealoha Pisciotta, September 30, 2011, p.138:12-18)

764. The DLNR staff criticized the viewplane analysis because the visual impacts were downplayed in the analysis. The analysis does not seem to account for the visual impact of the project on the individuals that move within and between impacted viewplanes, impact on visitors, and more importantly, the impact of viewing a new very large observatory from the perspective within the summit area. Laura Thielen, Chair, DLNR Ex A-309b FEIS Vol II p 21 of 531
765. The CDUA inaccurately stated, “The TMT project will be visible from 14 percent of the island area, restricted to the northern side of the island, including portions of Honoka‘a, Waimea, and Waikoloa.” because according to Figure 7-3: Viewshed and Primary View Analysis, the TMT would also be visible from significant portions of the western side of the island as well as parts of South Kona. (Ex. A-311, CDUA, p. 2-17, 7-7)
766. The TMT Observatory will impact the view plane in certain portions of the Pu‘u Kukahau‘ula State Historic Property (SIHP # 50-10-23-21438) and the Mauna Kea Summit Region Historic District (SIHP # 50-10-23-26869). (Ex. A-309b, TMT FEIS, p. G-62)
767. [T]here will be a visual impact for those that live in Waimea and West Hawai‘i, it is a significant feature that is going to be on the mauna... Tr. E. Kalani Flores, September 26, 2011, p. 32:13-16
768. Observatory construction has resulted in the moving of more than 10,000 cubic yards of material, grading and flattening of Kukahau‘ula ridges, and placement of man-made structures on Kukahau‘ula, affecting views to and from the summit. The development of observatories within the Astronomy Precinct substantially altered the appearance of the summit, and the presence of observatories continues to affect the performance of the religious and cultural practices. Ex. A-309 (TMT FEIS Section 3.16 Cumulative Impacts), p. 3-214
769. The Access Way will also result in a visual impact, particularly from a cultural perspective, where the access way occurs within the Kukahu‘ula Historic Property. Ex. A-309, (TMT FEIS Section 3.2 Cultural Resources), p.3-32

770. It was stated by James T. Hayes, Senior Supervising Environmental Planner at PB America, Inc., “Overall, the existing level of the cumulative visual impact from past projects at the summit is considered to be substantial, significant, and adverse.” Ex. A-4, J. Hayes WDT, p. 4
771. J. Hayes stated “This assessment of the existing level of cumulative visual impact is consistent with the Final Environmental Impact Statement for the Outrigger Telescopes Project, which, in Section 4.2.14.4, page 4-119, states: ‘The visual impacts of past and present astronomy-related activities in the MKSR have been substantial.’” Ex. A-4, J. Hayes WDT, p. 4
772. [W]hen the [TMT] Project is combined with the existing conditions, the cumulative visual impact of development on and near the summit of Mauna Kea will continue to be significant. Ex. A-4, J. Hayes WDT, p. 18-19
773. The CDUA states, “the Project’s visual impact will be less than significant.” Ex. A-311, (CDUA) , p. 2-17)
774. Currently view from the ridge of Kukahau`ula where the TMT observatory were would be visible are already dominated by views of the observatories which include Subaru, the Keck, the IRTF, and the Canadian-France telescope observatories located on this ridge. Lui-Kwan, TR. September 30, 2011, p. 32:11-16
775. At over 180 feet, the TMT would be the TALLEST building on Hawai‘i Island, surpassing the maximum height limits of 90 feet (120 feet for Hilo) for any commercial or resort buildings on this island based upon Hawai‘i County zoning codes. (Emphasis added) Ex. G-1, E. Flores DWT, p. 9.
776. The Design Guideline Section of the University of Hawai‘i’s Master Plan 2000, states; “...off- ridge facilities enclosures use colors and patterns such as the mottled brown tones of the surrounding lava landscape...as much as possible surfaces should be **non-reflective in the visible spectrum** to minimize glare and visibility from distant areas...roof design and material and color selections in conventional structures should merge the facility into the natural landscape. **Reflective Materials are to be avoided.** (Emphasis added) Ex. A21, p. XI-6
777. The CDUA stated that, “The finish for the TMT Observatory dome will be a reflective aluminum-like finish, similar to that of the Subaru observatory.” Ex. A-

311, CDUA, p. 7-9

778. The CDUA stated that, “When considering the visibility of the dome, the aluminum-like exterior finish was selected over white and brown because the aluminum-like finish reflects the colors of the sky and ground, which helps the dome blend into its setting and reduces the visual impact whether the summit is bare or covered in snow.” Ex. A-311, p. 7-9.
779. The reflective aluminum-like coating of the dome would not reflect the sky and reduce the visibility of the structure during the day due to its dome shape. Instead, it will be more visible due to the reflection of the sun back into one’s eyes when viewing it, similar to the visual impacts of the Gemini Observatory with its aluminum-like coating and dome shape. Ex. G-1, E. Flores DWT, p. 10; Ex. G-24
780. The actual observations of the sunlight upon the existing observatories on Mauna Kea was very limited in the visual impact analysis and was only actually observed by J. Hayes, “primarily during the mid-day period.” according to his testimony. J. Hayes, Tr. Aug. 16, 2011, p. 48:19-20
781. The aluminum-like finish on an observatory dome does not minimize the visual impact of existing observatories. Ex. G-1, E. Flores DWT, p. 10; Ex. G-12; Ex. G-24
782. Cultural Practitioners place a high value on the island’s visual resources, and particularly on pristine views of Maunakea.” Ex. A-27, VIATR, p. 11
783. The TMT will have a significant visual impact for Native Hawaiian cultural practitioners such as the Flore-Case ‘Ohana, interfering with their customary cultural and religious practices, including but not limited to prayers that are directed towards this sacred mountain. Ex. G-1, E. Flores DWT, p. 10; Ex. G-16
784. The viewshed analysis was limited to only 18 select viewpoint sites as noted in Table 7.2: Description of Viewpoint, Viewer Group and Primary View Direction in the CDUA. Ex. A-311, CDUA, p. 7-5
785. Based upon the viewshed analysis in Figure 7.3: Viewshed and Primary View Analysis in the CDUA, the TMT observatory would also be visible from the South Kona and North Kohala districts. However, the analysis fails to discuss

- any impacts upon these viewsheds. Ex. A-311, CDUA, p. 7-7
786. Significant areas such as the large residential community of Waikoloa Village [with a population of 4,806 and 1,750 households according to 2000 Census] as well as the Puako community have been excluded from this viewshed analysis resulting in this CDUA being incomplete. Ex. A-311, CDUA, p. 7-5
787. Significant resort/residential development areas Mauna Kea Resort, Kuki‘o, and Kona Village have been excluded from this viewshed analysis resulting in this CDUA being incomplete. Ex. A-311, CDUA, p. 7-5
788. The proposed TMT observatory would be predominantly visible by Department of Hawaiian Home Land beneficiaries from their Kawaihae, Lālāmilo, Pu‘ukapu, and other homesteads in the Waimea area. Ex. A-311, CDUA, p. 7-5
789. The VIATR includes photos that are identified as Viewpoint 6: Pu‘ukohola Heiau (Primary View). Ex. A-27, VIATR, p. A-4; Ex. G-23
790. J. Hayes could not confirm if these photos (Ex. G-23) were taken from Pu‘ukoholā Heiau because he did not personally take these photos. J. Hayes, Tr. Aug. 16, 2011, p. 46:1-2; Ex. A-27, VIATR, p. A-4; Ex. G-23
791. These photos (Ex. G-23) display a pavilion, picnic benches, BBQ pits, camping tents, lifeguard stand, and beach that are reflective of the activities that occur at the Hawai‘i County Samuel M. Spencer Beach Park. Ex. A-27, VIATR, p. A-4; Ex. G-23
792. Pu‘ukoholā Heiau is a National Historic Site of the U.S. Department of the Interior - National Park Service (NPS). Ex. G-19, NPS Pu‘ukoholā Heiau Brochure
793. Pu‘ukoholā Heiau is one of the last major temples built in the Hawaiian Islands, was constructed by Kamehameha the Great from 1790 to 1791. This cultural site played a crucial role in the unification of the Hawaiian Islands, for Kamehameha built the temple as a result of a prophecy that came through a priest named Kapoukahi. Ex. G-19, NPS Pu‘ukoholā Heiau Brochure
794. The orientation for cultural ceremonies conducted within Pu‘ukoholā Heiau is towards the mountains as noted by the placement of the *ki‘i* (images), *lele* (altar),

- and *anu‘u* (oracle tower). Ex. G-19, NPS Pu‘ukoholā Heiau Brochure
795. The visual impact analysis did not provide an accurate assessment from the viewpoint of the Pu‘ukoholā Heiau National Historic Site. Ex. A-311, p. 7-8
796. J. Hayes disclosed in cross examination that the visual impact analysis did not analyze the impact to cultural practitioners’ nighttime viewing. J. Hayes, Tr. Aug. 16, 2011, p. 72:7-8
797. The CDUA stated that “[Ex A-311] Figure 7.8 shows that the TMT Observatory will add a new visual element to a relatively undeveloped portion of the summit region. That element will be visible from viewpoints along the northern ridge of Kūkahau‘ula and from roadways within the northern portion of the summit region.” (Ex. A-311, CDUA, p. 7-11)
798. Figure 7.8: Simulation of the TMT Observatory from Near Keck Observatory Viewing North in the CDUA confirms that the TMT will add a new visual element to an undeveloped portion of the summit region. (Ex. A-311, CDUA, p. 7-12)
799. The CDUA stated that “...the TMT Observatory will be visible within the northern portion of the summit region, including the northwestern portion of Kūkahau‘ula, referred to as Pu‘u Hau‘oki, Pu‘u Pōhaku, and Pu‘u Poli‘ahu.” (Ex. A-311, CDUA, p. 7-11)
800. J. Hayes confirmed the TMT would be visible from Pu‘u Poliahu as noted by the red balloon during the site visit on August 11, 2011. (J. Hayes, Tr. Aug. 16, 2011, p. 79:12)
801. J. Hayes stated, “As the simulation in Figure 12 shows, from this perspective, the TMT Observatory will add a substantial new visual element in the landscape that will be visible from viewpoints along the northern ridge of Kūkahau‘ula and by people as they travel within the northern portion of the summit region.” (Ex. A-4, J. Hayes DWT, p. 14)
802. The TMT would be visible from the northern ridge of the Kūkahau‘ula summit such as from the Subaru Observatory as noted by the red balloon during the site visit on August 11, 2011. (J. Hayes, Tr. Aug. 16, 2011, p. 88:10-15)

803. The CDUA inaccurately stated that, “The majority of visitors to the summit region **and cultural practitioners** visit the Kukahau‘ula summit, not the northern ridge of Kukahau‘ula.” (Emphasis added) (Ex. A-311, CDUA, p. 7-11)
804. The conclusion that “cultural practitioners visit the Kukahau‘ula summit, not the northern ridge of Kukahau‘ula” relied upon discussions with Mauna Kea Rangers and other people, not based upon consultation with cultural practitioners. (J. Hayes, Tr. Aug. 16, 2011, p. 86:5-14)
805. From the northern ridge of the Kukahau‘ula summit, the TMT would be in line of sight of Maui and Haleakala. (J. Hayes, Tr. Aug. 16, 2011, p. 92:15-19)
806. The CDUA stated that, “The TMT Observatory will add a new visual element to the northern plateau area that will be visible to varying degrees from the shrines along the northern slopes of Mauna Kea.” (Ex. 311, CDUA, p. 7-13)
807. The CDUA inaccurately stated that, “The TMT Observatory will appear in the view directly toward the summit from **only a few of the shrines** on the northern plateau.” (Emphasis added) (Ex. 311, CDUA, p. 7-13)
808. There are numerous historic properties and cultural resources (find spots) on the northern plateau that have been identified in the Archaeological Inventory Survey of the Mauna Kea Science Reserve (AIS-MKSR). (Ex. A-28, AIS-MKSR, p. 3-12)
809. According to J. Hayes, a viewshed analysis was not done from these historic properties and cultural resources on the northern plateau. (J. Hayes, Tr. Aug. 16, 2011, p. 67:8-20)
810. Today the cumulative impact of all of the observatories is overwhelming and is an adverse, significant and substantial impact to open space and natural beauty characteristics. The TMT project and associated infrastructure will without question increase this impact-and this is unacceptable. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 9
811. The University has not used traditional methods to assess the viewshed impacts. The University claims the view planes or viewsheds will not be affected. This is not true. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 5

812. Most of our practices rely on some kind of view plane, because they are about the relationship between Papa and Wakea (our relationship with and to the earth and the celestial bodies and heavens). Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 5
813. We have repeatedly included concerns for the impacts on various ceremonies exercised on Mauna Kea, such as the solstice and equinox ceremonies that we along with many other Hawaiian groups (i.e. Royal Order of Kamehameha I and others) collectively participate in throughout the year on Mauna Kea and other sacred sites around the islands. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 5
814. The TMT is very big and there is no question it will be the most dominant feature in the open space and view planes from Mauna Kea. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 7
815. The Hawai'i County General Plan (2005) recognizes the importance of preserving the island's natural and scenic beauty. It establishes goals, policies and standards to identify and protect scenic vistas and view planes. The General Plan also provides guidelines for designating sites and vistas of extraordinary natural beauty to be protected, and includes the standard "Distinctive and identifiable landforms distinguished as landmarks, e.g. Mauna Kea, Waipio Valley." (Ex. A-311, CDUA, p. 7-1)
816. Petitioner Flores noted that the CDUA included misleading information by downplaying the visual impacts that do not conform to the Hawai'i County General Plan (2005) by narrowing the discussion to only one goal (b) and eliminating any assessment on the other established goals in the area of Natural Beauty (7.2 Goals); (a) Protect, preserve and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources. (b) Protect scenic vistas and view planes from becoming obstructed. (c) Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty. In addition, the CDUA failed to disclose that the TMT Project does not conform to the General Plan goals established for the Natural Resources. (Ex. A-311, CDUA, p. 7-1, 7-6; E. Flores, Tr. Sep. 30, 2011, p. 112:23-25, 113:1-25, 114:1-2)
817. Petitioner Flores noted that if the TMT is constructed on this mountain, it will be the TALLEST building on this island...at 18 stories, twice as high as the Hilo Hawaiian Hotel in Hilo and three times higher than the King Kamehameha Hotel in Kona, sitting on this sacred summit. At over 180 feet, the TMT would considerably surpass the maximum height limits of 90 feet (120 feet for Hilo) for

- a commercial or resort building on this island. Why would we have Hawai'i County zoning codes to restrict the height of buildings to protect the cherished view planes within our island landscape, yet allow the BLNR to shrewdly disregard them when building on this mountain in a conservation district? Ex. G-1, (Expert Witness E. Kalani Flores, June 28, 2011, WDT), p. 9
818. Petitioner Flores noted that in addition, the observatory's footprint, support buildings, parking lot, and area disturbed during construction will adversely impact roughly five acres on this summit. Moreover, there will be substantial grading and excavation involved with the construction of this observatory. Ex. G-1, (Expert Witness E. Kalani Flores, June 28, 2011, WDT), p. 9
819. The TMT will add to the already obstructed day and night view planes used by cultural practitioners. This is an adverse, significant and substantial impact on the cultural practices and uses of Mauna Kea. Therefore the TMT does not preserve or improve upon the open space and natural beauty characteristics of Mauna Kea, nor does it demonstrate it will not have an adverse or significant impact on the cultural resources of Mauna Kea. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 7
820. When the UH says the TMT will not obstruct our view planes --I am not sure I understand what they are talking about--does that mean just that my eyes--our eyes will not be covered by the domes or building? The view plane is about the open space--the view unobstructed by man-made features--like big buildings. P. K. Neves, June 28, 2011, WDT, p. 4
821. As our Kupuna have said, when is enough, enough. How can we be in solitude and beauty with these foreign objects in our view planes, view planes that have existed since these islands were created by ke akua. TR. Paul K. Neves, August 30, 2011, p. 43:3-7
822. When we look out on the plateau where the TMT is proposing to site their project-- it is not just that it will now be blocking our eyes (depending on where we are looking from) but it will be the most dominant feature in our eyes and therefore the most dominant feature in our customary and traditional view plane. It is this view plane that we use to look and to honor the high maunas down the island chain. For me and my Ohana--that view is significant--the view of Haleakala--it is the view and the practice of honoring our ancestors, our akua residing in the high lewa. It is our way of honoring the motions of the heavens--which is also honoring the movements of the kupuna and the Akua. We can't

- partition our beliefs. P. K. Neves, June 28, 2011, WDT, p. 4
823. The TMT will impact us and many other people that seek to observe the sunset from Mauna Kea. The TMT will be in direct line of site of many traditional spiritual and religious view planes, including those towards Haleakala, the sunset and other sacred sites. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 7
824. When people come to view the sunset, including those of us doing ceremonies, the TMT will be a dominant feature in that view plane, including ours as we honor the sun as it sets. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 7
825. The TMT will be visible anywhere from that side of the Kukahau`ula and from below the summit. You will be able to see it from Pu`u Poliahu as well. This pu`u is very important.
Yet, based on the University's documents there is this idea that if the TMT is not completely obstructing your eye it is not obstructing a particular view plane—but this is not correct. A view plane is the open plane and what is in it or not. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 7
826. You cannot stop the sun from rising--so a view plane is not just by sight alone (in our customary beliefs--`ike is to know and see the event, have knowledge of the event and to come to understand its existence--which in and of itself has meaning - -this meaning you receive from the na`au--so the view plane begins in the na`au not just in the maka (eyes). P. K. Neves, June 28, 2011, WDT, p. 3
827. For example, where I go to honor these relationships I can see from Pu`u Hau Oki that `akala, yeah? I can see Haleakala, and I can see (Pu`u) Haukea. It's not Pu`ukea, but it's still a Kea. And I would be able to see her from there. But I will not be able to from these places if the TMT is built because it will be in the way—it will be right in the middle of the views from Mauna Kea to Haleakala. P. K. Neves, June 28, 2011, WDT, p. 3

TRADITIONAL CULTURAL PROPERTIES: HISTORIC DISTRICT, SACRED SUMMIT

Traditional Cultural Properties

828. A Traditional Cultural Property [TCP] can be defined generally as one that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. (Ex. A-28, FAIS-AP, p. 5-15 & 5-17)

829. The National Register Bulletin 38 “*Guidelines for Evaluating and Documenting Traditional Cultural Properties*” (Parker and King 1990), provides agencies further guidance for assessing the importance of traditional cultural beliefs or practices (or cultural attachment) while assessing cultural resources and proposed actions that will affect their integrity. (Ex. A21, App. I, p. 27)
830. In defining “*traditional cultural properties*”, the National Register explains: “traditional” in this context refers to those beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice. The traditional cultural significance of a historic property, then, is significance derived from the role the property plays in a communities historically rooted beliefs, customs, and practices. (Ex. A21, App. I, p. 27).
831. The entire mountain region of Mauna Kea from approximately the 6,000 foot elevation to the summit, including the Mauna Kea Science Reserve, was identified in the Cultural Impact Assessment [CIA] Study (1999) as a potential TCP. (Ex. A-41, CIA, p. 39).
832. The CIA identified a number of potential traditional cultural properties within the Mauna Kea Science Reserve Master Plan project area. These are historic properties that are of importance to Native Hawaiians because they possess traditional cultural significance derived from associated cultural practice and beliefs. These historic properties include the following:
- The entire mountain region, from approximately the 6,000 feet elevation (The saddle area) to the summit;
 - Pu`u Kukahau`ula--a cinder cone that is the summit peak of Mauna Kea (sometimes also referred to by the modern name of Pu`u Wekiu);
 - Pu`u Poliahu--a prominent summit region cone situated west of Pu`u Kukahau`ula;
 - Pu`u Lilinoe--a prominent summit region cinder cone situated to the south east of Pu`u Kukahau`ula;
 - Waiau--a shallow lake and its adjacent cinder cone situated in the summit region, to the southwest of Kukahau`ula;
 - Pu`u Mekanaka and Kaupo vicinity--a cluster of two prominent cinder cone situated near the edge of the summit region to the northeast of Pu`u Kukahau`ula;
 - Mauna Kea--Umikoa Trail--and foot and horse trail extending between Kuka`iau in Hamakua to immediately south of the summit area;

- Mauna Kea-Humu`ula Trail-a foot and horse trail extending from the Humu`ula sheep station up to the summit area; and

A number of lesser foot and horse trails-including the Mauna Kea-Laupahoehoe-Waipunalei Kanakaleonui Trail, the Mauna Kea-Makahalau-Kemole Trail, and the Waiau-Waikiki-Pu`u La`au Trail. (Ex. A-21, App. N, p. 39-40)

833. SHPD has emphasized that the TMT project will result in impacts to the Mauna Kea Summit Region Historic District. (Ex. A-309b, TMT FEIS, Appendix J, p. 20)

834. **Within the historic district, the effect of a project on the historic district as a whole needs to be assessed as well as the project's effect on individual historic properties located within or immediately adjacent to the project area.** (Emphasis added) (Ex. A-309b, TMT FEIS, p. G-59)

835. The effect of a project on the historic district must be addressed even if no individual historic properties are found within or immediately adjacent to the project area. (Ex. A-309b, TMT FEIS, p. G-59)

836. The TMT Project is a potential adverse effect on two significant historic properties (Pu`u Kūkahau`ula State Historic Property, SIHP # 50-10-23-21438 and the Mauna Kea Summit Region Historic District, SIHP # 50-10-23-26869). (Ex. A-309b, TMT FEIS, p. G-59)

837. Whichever of the two Access Way options that is chosen will skirt the lowest edge of SIHP # 50-10-23-21438 at approximately the 13,400-foot contour approximately 400 feet below the 13,796 foot summit of the historic property. The Access Way will have an adverse physical impact to this lowest westernmost portion of the historic property. (Ex. A-309b, TMT FEIS, p. G-57)

838. The CDUA referenced 4 historic properties in the vicinity of the TMT Observatory, 2 historic properties in the vicinity of the Batch Plant, and 6 historic properties in the Hale Pohaku area. (Ex. A-311, CDUA, p. 4-1, 4-3, 4-5)

839. The regular presence of any people is not considered a normal condition for Maunakea and could affect its spiritual and sacred quality, and hence the Historic District. (Ex. A-309b, TMT FEIS, p. G-60 & G-61)

840. The noise and dust generated by Project activities will adversely affect the spiritual and sacred quality of Maunakea and the Historic District. (Ex. A-309b,

TMT FEIS, p. G-61)

841. Significance evaluation should conform with SHPD administrative rules or the National Register criteria (National Register Bulletin 15) if the project is federally funded or if the historic properties are located within the historic district. (Ex. A-28, FAIS-AP, p. 7-2)
842. The Applicant concedes that the Project would have a substantial adverse impact on the spiritual and sacred quality of Mauna Kea by:
- 843.
- (a) degrading the integrity of the cinder cone;
 - (b) adding a man-made structure to the northern plateau that would create a substantial visual disturbance;
 - (c) placing employees in the northern plateau;
 - (d) increasing the potential for accidental release of wastewater into the environment;
 - (e) increasing the potential for accidental release of hazardous substances into the environment; and
 - (f) generating dust and noise. Any one of these anticipated results of the TMT project being built would undermine the spiritual setting and sacred quality of Mauna Kea. (Ex. Jt-8/A-308, page 3-29)
844. Based on the Applicant's review of existing information and input obtained from interviews conducted through the "Cultural Impact Assessment" process, the proposed TMT would impact the spiritual and sacred quality of Mauna Kea. (Ex. Jt-8/A-308, page 3-29)
845. [T]he project is anticipated to result in additional impacts to cultural practices and beliefs for some, but not all, individuals. Cultural practices would essentially be precluded in the 6.2 acres of the 11,288-acre MKSR that would be occupied by the TMT Observatory and Access Way. Ex. A35, (TMT FEIS Section 3.2 Cultural Resources), p. 3-28
- The proposed project would decrease the suitability of the northern plateau area for spiritual observances and offerings. (Ex. Jt-8/A-308, page 3-27)
846. The project is anticipated to result in additional impacts to cultural practices and beliefs. Cultural practices would be precluded in the 6.2 acres occupied by the TMT Observatory and Access Way. (Ex. Jt-8/A-308, page 3-28)

847. In addition, the introduction of new elements associated with the project in the area of the northern plateau would adversely affect the setting in which such practices could take place. (Ex. Jt-8/A-308, page 3-26)
848. There are also impacts to the cultural sites on the mountain. The cultural sites is where this project is no going into a terrain where there's ahu, shrines and there is no project there...and now it's being proposed to put this project right in the midst of these shrines. Tr. E. Kalani Flores, September 26, 2011, p. 32:22-25, 33:1-3
849. Where conflict began was when the KECK 1 & 2, SMA and Subaru projects were being proposed...I realized the landscape was being taken over; really taken over. (K. Pisciotto, June 28, 2011, WDT, p. 9)
850. It was one thing to have some of the telescopes up there scattered here and there, because the landscape was still the dominant feature and all of the beauty surrounding you still swept you up even with the telescopes on some of the tops of the pu'u. (K. Pisciotto, June 28, 2011, WDT, p. 9)
851. Today the cumulative impact of all of the observatories is overwhelming and is an adverse, significant and substantial impact to open space and natural beauty characteristics. The TMT project and associated infrastructure will without question increase this impact-and this is unacceptable. (K. Pisciotto, June 28, 2011, WDT, p. 9)
852. The conservation district is to preserve land deemed very important. By developing that land you devalue its purpose. To contemplate developing conservation lands you bring injury upon us who worship there and our customs. Neves Tr. September 30, 2011, p. 44:5-9
853. The Project has the potential to impact the spiritual and sacred quality of Mauna Kea (TR. (Mr. E. Kalani Flores citing TMT FEIS p. 3-29) September 26, 2011, p. 24:20-22
854. The ancestral *akua* and *kupua* who are connected to Mauna a Wakea will be directly and immediately affected by the proposed TMT project. (Ex. G-1, E. Flores WDT, p. 7)
855. When the *piko* of the summit is obstructed with the physical excavation of the landscape, asphalt and cement pavement, metal posts implanted in ground, buildings, and construction, it curtails or prevents this flow of energy. (Ex. G-1, E. Flores WDT, p. 8)

856. The electrical substation, power lines, and high voltage current that runs to the top of the summit is interfering and disturbing the electromagnetic fields and vortexes that naturally occur on the mountain. (Ex. G-1, E. Flores WDT, p. 8)
857. The existing development on the summit is causing adverse impacts and significant disturbances to the natural electromagnetic fields and vortexes on the mountain. (Ex. G-1, E. Flores WDT, p. 8-9)
858. Existing development on the summit is causing adverse impacts and significant obstructions to the life forces that flow into these islands through this *piko*. (Ex. G-1, E. Flores WDT, p. 8). For comparison, the Jewish people go to the Wailing Wall--the Temple is not there but they still go to the wall---in order to recognize the Temple--you can't partition off your beliefs and your practice of this belief. Mauna Kea is the environment of our belief--just like the Wailing Wall still represents the temple, which represents the Jewish people's beliefs. And what we see from Mauna Kea, from atop there and across there--like from Pu'u to Pu'u or ahu to ahu are all a part of our beliefs. When this environment is destroyed we wail--just as the Jewish people mourn at their wailing wall—and we mourn with them because we feel their pain too. P. K. Neves, June 28, 2011, WDT, p. 4
859. We mourn the loss of the Temple--but we don't want to have to mourn the loss of this temple known as Mauna Kea--we want to rejoice in the Creator's creation and in Akua's beauty. This is how our rights are negatively impacted because they destroy the very environment of our spirituality and beliefs, we lose the landscape which we use to perform these ceremonies of Aloha and Peace. P. K. Neves, June 28, 2011, WDT, p. 4
860. The University maintains that they have right to determine what of modern practice is appropriate or not. What the University is not addressing is the "reasonable exercise" of our traditional cultural practices. Affirming the continuation of traditional and cultural practice is useless if there are no actual protections provided for practitioners to continue their practices. University obstructs our practice regularly, and the BLNR has taken no affirmative stand to correct this problem. K. Pisciotta, June 28, 2011, WDT, p. 9
861. To some individuals the Project could represent a decrease in the suitability of the northern plateau area for spiritual observances and offerings. Ex. A35, (TMT FEIS Section 3.2 Cultural Resources), p. 3-27

862. How can we practice our customs and grow spiritually when our spiritual place and natural setting is used for 18 story buildings, parking lots, pull stations and roads. Tr. Paul K. Neves, September 30, 2011, p. 46:3-6
863. Hawai'i Revised Statute 711-1107 on Desecration specifically states that no one may commit the offense of desecrating "a place of worship or burial," and the statute defines "desecrate" as "defacing, damaging, polluting, or otherwise physically mistreating in a way that the defendant knows will outrage the sensibilities of persons likely to observe or discover the defendant's action." Educating TMT visitors and personnel about our outrage will not mitigate these ongoing forms of desecration to an "insignificant" level. Ex. B20, Expert Witness, Dr. J. Kehaulani Kauanui's WDT, p. 2.
864. Digging into the sacred landscape not only impacts us directly by changing the landscape that our practices rely on but it impacts us indirectly as well, because our house of prayer and worship is being destroyed for a purpose not related to our practice. The burial ground of our most sacred ancestors is being destroyed and desecrated. K. Pisciotto, 28 June, 2011, WDT, p. 13-14
865. This proposed largest telescope in the world is a continued desecration of this sacred place, the sacred temple of Mauna Kea a Wakea. This largest telescope further desecrates the temple of worship, and severely impacts my cultural practice and growth as a kumu hula, High Chief of the Royal Order of Kamehameha I, from which exist traditional customary leadership. P. Neves, August 25, 2011, TR. p. 111:12-19
866. I'm here as kumu hula because what they do to Mauna Kea seriously impacts my family today, right now, right here, right there. Not in some plan somewhere. P. Neves, August 25, 2011, TR. P. 109:2-5
867. The concerns many Hawaiian people have over more and more development of Mauna Kea is not hard to understand when you place Mauna Kea in the context of other religious places. K. Pisciotto, 28 June, 2011, WDT, p. 13
868. Even if other sacred sites around the world were good sites for astronomy it is not likely that astronomy proponents would consider proposing what they are for Mauna Kea. For example, observatories are not being proposed or built on top of Mount Fuji, because it is a place of national importance and because it is held in spiritual reverence by the people of Japan. No one has proposed to level Mecca or Mount Sinai either. Would not the worshippers of Islam be upset if the dome of

- the rock was being leveled to put observatories on it? Or would not the Catholic people be upset if the Vatican was going to be taken down so a McDonalds or a bunch of unrelated developments could sit there instead? K. Pisciotto, 28 June, 2011, WDT, p. 13
869. I believe the respective worshipper of those various religions would be very upset at the proposition of destruction of their holy sites. It is no different for Hawaiians.
K. Pisciotto, 28 June, 2011, WDT, p. 13-14
870. We have a right to practice in the environment of our belief, and the landscape of Mauna Kea is the environment of our belief. Ex C-1 K. Pisciotto, 28 June, 2011, WDT, p. 11
871. The telescopes are man's destruction of Creator's place--a place created for man to come to and be pili to the heavenly realm--close to Akua's beauty and Aloha. P. K. Neves, June 28, 2011, WDT, p. 4
872. The idea of previously disturbed--disturbance is Hehi ana-, which means to trample--trample on a covenant--a covenant is a holy agreement--sacred agreement--a religious agreement between Akua and yourself--to use that word is to say the land is being trampled upon--but here and now it mean over and over and over again! Every time --building on Mauna Kea--we feel the `Aina being trampled upon--and our covenant assaulted--Aloha `Aina is assaulted. P. K. Neves, June 28, 2011, WDT, p. 4
873. Such development on Mauna Kea is desecration--in Hawaiian the word for desecration is Hauna `eli--which means also to be in contempt of court . But on Mauna Kea is means to have contempt for Akua's court--Akua's law (the Kanawai) which is codified in the `Aina. P. K. Neves, June 28, 2011, WDT, p. 4
874. I think in the end the problem is not with astronomy it is that astronomy is trying to do its work in our house of prayer, and in a conservation district, which is for protecting the cultural, and natural resources, the very delicate life forms that live there and where the waters that give us all life flow from. P.K. Neves, June 28, 2011, WDT, p. 5
875. The observatories have impacted these things and this unacceptable. The TMT is going to impact the sacred nature of Mauna Kea and it simply does not meet the criteria (eight criteria) that the rules require and therefore this project should not

be approved by BLNR. P. K. Neves, June 28, 2011, WDT, p. 5

876. The BLNR is supposed to protect all of these things including our simple ability to practice our cultural and religious practice—yet for all these years BLNR has just been turning a blind eye to Mauna Kea—to our pleas for help with protecting Mauna Kea... The problem is more serious because we fear it will set a negative precedent—because if they can do this to Mauna Kea and Haleakala what other Conservation Districts can they do it to? P. K. Neves, June 28, 2011, WDT, p. 5

877. The issues surrounding Mauna Kea are policy issues and they challenge the very foundation of the land use laws in our state. P. K. Neves, June 28, 2011, WDT, p. 5

878. We have been asking BLNR to take a hard look for more than a decade now—so my question is this—when is enough really enough? We already won our previous case in court—that was when BLNR was supposed to re-think their responsibilities, but yet here we are again doing yet another contested case hearing-over virtually the same issues all over. This needs to stop—it is not fair to make the citizens carry all of the legal battle just to get BLNR to do what they are required by law to do. . P. K. Neves, June 28, 2011, WDT, p. 5

879. [W]hen the land, the waters, the life forms suffer, we feel this suffering, the process of creation begins to un-ravel and de-creation begins. The law, the kanawai is broken. We lose our place in time and space and then we are lost. Ex C-1 K. Pisciotto, June 28, 2011, WDT, p. 1

880. This is why we stand for Mauna Kea. It is our kuleana to stand, our collective kuleana, it is our honor to stand, our collective honor, it is our blessing to stand, our collective blessings... today however, there is sorrow, collective sorrow because we know not how else to live, not in destruction, not in the absence of its nature, the sacred nature. In Aloha all are blessed and that is all we know. Aloha Ke Akua, Na Akua, Na `Aumakua. Ex C-1 K. Pisciotto, June 28, 2011, WDT, p. 1

881. To be clear, many people, including myself have been practicing traditional and customary cultural and religious practices since the eighties and long before the University even created the Office of Mauna Kea Management in their 2000 Master Plan. It can be said that we are some of the most obvious practitioners, as we have been very outspoken and have worked hard to actually help the University and BLNR to consider how to better protect the sacred nature and

- properties of Mauna Kea. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 9
882. Many of our ceremonial things such as our ahu (shrines) and lele (ceremonial platforms) - areas used by many other practitioners and people that come to offer prayers and give offerings - have been desecrated and destroyed by the University's own personnel. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 9
883. It impacts me as a husband, father, a brother, and uncle, and grand uncle and great grand uncle, Wakea a member of my family and as a Hawaiian National. P. Neves, Tr. August 25, 2011, TR.. p. 111:20-23
884. This proposal and pull boxes, they are comprehensive desecration of my religious rights, spiritual freewill and growth. The cumulative impacts threaten my survival as a human being and my cultural practices. (P. K. Neves, Tr. August 25, 2011, p. 111 24-25, p.112:1-3)
885. The Thirty Millimeter Telescope, TMT, telescope development in this my sacred temple of religious practice will seriously interfere with my ability to adore Mauna Kea. How can we put our shattered lives back together again if these foreign objects are allowed to alter the natural landscape in the natural temple, Mauna Kea? (TR. Paul K. Neves, September 30, 2011, p. 42:21-25, 43:1-2)
886. Desecration under the camouflage of education is not education at all. And it violates and endangers my life. The military can camouflage its guns but its intent cannot be hidden. This 18 story building cannot be covered up or camouflaged in this ahu of Mauna a Wakea. P. Neves, August 25, 2011, TR. p.112:4-9
887. For example, in the case of my family ahu it was one thing to have it destroyed once, but since that time it has continued to be desecrated and destroyed on at least seven separate occasions and I can prove at least three of the incidents directly involved University personnel. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 9
888. In fact, the last ahu we made (that is Ms. Keomailani Von Gogh, Mr. Paul K. Neves and I made together) was not to be found on June 18, 2011. My Auntie's burial remains were desecrated at this site also, as she requested that she be brought there after her passing. (See Exhibit C-7, a picture of my family stone, with me in the picture for context) Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 9

889. The existing telescopes atop Mauna Kea constitute both symbolic and material evidence of colonial rule, and as such carry out structural and cultural violence. These observatories literally supplant our indigenous temple of worship. TR. August 25, 2011, p. 84:13-16.
890. To ascend Mauna Kea, is to ascend through the lewa lani (the levels of the heavens). As you ascend, it is as if you are peeling away layers of yourself, so that when you reach the high levels, you approach in humility as your heart lays open before the Akua, and they see you.
891. Their eyes upon you, their lessons learned, their requests fulfilled, their blessing given. Ex C-1 K. Pisciotta, June 28, 2011, WDT, p. 1
892. I have always supported astronomy because I believe it is a noble endeavor that should be supported. However, I do not believe it is of so much importance that it should be allowed to overtake and destroy everything else in its wake. I am for protecting the cultural and natural resources of Mauna Kea, which unlike astronomy facilities, are actually threatened. Large scale astronomy is being conducted at over 93 sites around the world, but here on Mauna Kea many of the plant and animal species can only be found on Mauna Kea and nowhere else on earth; and many of any of the cultural traditions can only be conducted on Mauna Kea and nowhere else on earth. K. Pisciotta, June 28, 2011, WDT, p. 4
893. Due to the immense size of the proposed TMT project, it will cause further substantial, significant, and cumulative adverse impacts upon Mauna a Wākea. (Ex. G-1, E. Flores WDT, p. 8)
894. In the CDUA, the Applicant downplayed the impact of the TMT Project upon historic properties and cultural resources by limiting the discussion to Area E of the Astronomy Precinct instead of the MKSR as a whole. (Ex. A-311, CDUA, p. 4-1)
895. The accurateness of Figure 4.1: Historic Properties in the Vicinity of the TMT Project Areas that was submitted as part of the CDUA is uncertain. There appears to be some alteration and elimination of significant information from this figure. (A-311, CDUA, p. 4-2)
896. Although the source for this figure is identified as Pacific Consulting Services Inc. (2010), S. Collins of PCSI stated, “We would not have had the TMT info on our original figure. I believe that’s been added to this one since you attained it

from the CDUA.” (Ex. A-311, CDUA, p. 4-2; S. Collins, Tr. Aug. 17, 2011, p. 33:4-9)

897. In the pursuit of scientific exploration, the proposed TMT project will contribute to the cumulative desecration and destruction of one the most sacred sites on this Earth. In the desire to discover the potential for life in other parts of this universe, some have forgotten the sacredness for all aspects of life on this planet. We are in the time when the understanding of the spiritual universe extends beyond the physical universe. (Ex. G-1, E. Flores WDT, p. 12)

NATIVE HAWAIIAN TRADITIONAL, CUSTOMARY, AND RELIGIOUS PRACTICES, USES, AND ACCESS

898. The TMT Project would be a significant visual impact when seen from the front portion of the Flores-Case ‘Ohana home, interfering with their customary cultural and religious practices, including but not limited to prayers that are directed towards this sacred mountain. (Ex. G-1, E. Flores WDT, p. 10)

899. Observatory construction has resulted in the moving of more than 10,000 cubic yards of material, grading and flattening of Kukahau‘ula ridges, and placement of man-made structures on Kukahau‘ula, affecting views to and from the summit. The development of observatories within the Astronomy Precinct substantially altered the appearance of the summit, and the presence of observatories continues to affect the performance of the religious and cultural practices. (Ex. A-309, FEIS p. 3-214)

900. Whichever of the two Access Way options that is chosen will skirt the lowest edge of SIHP # 50-10-23-21438 at approximately the 13,400-foot contour approximately 400 feet below the 13,796 foot summit of the historic property. The Access Way will have an adverse physical impact to this lowest westernmost portion of the historic property. (Ex. A-309b, FEIS, p. G-57)

901. The proposed project would decrease the suitability of the northern plateau area for spiritual observances and offerings. (Ex. A-308, page 3-27)

902. The project is anticipated to result in additional impacts to cultural practices and beliefs. Cultural practices would be precluded in the 6.2 acres occupied by the TMT Observatory and Access Way. (Ex. A-308, page 3-28)

903. In addition, the introduction of new elements associated with the project in the area of the northern plateau would adversely affect the setting in which such practices could take place as well as a decrease the suitability of the northern plateau area for spiritual observances and offerings. (Ex. A-308, page 3-26, 3-27)
904. We mourn the loss of the Temple--but we don't want to have to mourn the loss of this temple known as Mauna Kea--we want to rejoice in the Creator's creation and in Akua's beauty. This is how our rights are negatively impacted because they destroy the very environment of our spirituality and beliefs, we lose the landscape which we use to perform these ceremonies of Aloha and Peace. (Ex. F-1, Neves WDT, p. 4)
905. How can we practice our customs and grow spiritually when our spiritual place and natural setting is used for 18 story buildings, parking lots, pull stations and roads. (Neves, Tr. September 30, 2011, p. 46:3-6)
906. Digging into the sacred landscape not only impacts us directly by changing the landscape that our practices rely on but it impacts us indirectly as well, because our house of prayer and worship is being destroyed for a purpose not related to our practice. The burial ground of our most sacred ancestors is being destroyed and desecrated. (Ex. C-1, Pisciotto WDT, p. 13-14)
907. This proposed largest telescope in the world is a continued desecration of this sacred place, the sacred temple of Mauna Kea a Wakea. This largest telescope further desecrates the temple of worship, and severely impacts my cultural practice and growth as a kumu hula, High Chief of the Royal Order of Kamehameha I, from which exist traditional customary leadership. (Neves, Tr. August 25, 2011, p. 111:12-19)
908. I'm here as kumu hula because what they do to Mauna Kea seriously impacts my family today, right now, right here, right there. Not in some plan somewhere. (Neves, Tr. August 25, 2011, p. 109:2-5)
909. The telescopes are man's destruction of Creator's place--a place created for man to come to and be pili to the heavenly realm--close to Akua's beauty and Aloha. (Ex. F-1, Neves WDT, p. 4)
910. The idea of previously disturbed--disturbance is Hehi ana-, which means to trample--trample on a covenant--a covenant is a holy agreement--sacred

- agreement--a religious agreement between Akua and yourself--to use that word is to say the land is being trampled upon--but here and now it mean over and over and over again! Every time --building on Mauna Kea--we feel the `Aina being trampled upon--and our covenant assaulted--Aloha `Aina is assaulted. (Ex. F-1, Neves WDT, p. 4)
911. Such development on Mauna Kea is desecration--in Hawaiian the word for desecration is Hauna `eli--which means also to be in contempt of court . But on Mauna Kea is means to have contempt for Akua's court--Akua's law (the Kanawai) which is codified in the `Aina. (Ex. F-1, Neves WDT, p. 4)
912. The observatories have impacted these things and this unacceptable. The TMT is going to impact the sacred nature of Mauna Kea and it simply does not meet the criteria (eight criteria) that the rules require and therefore this project should not be approved by BLNR. (Ex. F-1, Neves WDT, p. 5)
913. The BLNR is supposed to protect all of these things including our simple ability to practice our cultural and religious practice—yet for all these years BLNR has just been turning a blind eye to Mauna Kea—to our pleas for help with protecting Mauna Kea...The problem is more serious because we fear it will set a negative precedent—because if they can do this to Mauna Kea and Haleakala what other Conservation Districts can they do it to? (Ex. F-1, Neves WDT, p. 5)
914. When the land, the waters, the life forms suffer, we feel this suffering, the process of creation begins to un-ravel and de-creation begins. The law, the kanawai is broken. We lose our place in time and space and then we are lost. (Ex. C-1, Pisciotto WDT, p. 1)
915. Many of our ceremonial things such as our ahu (shrines) and lele (ceremonial platforms) - areas used by many other practitioners and people that come to offer prayers and give offerings - have been desecrated and destroyed by the University's own personnel. (Ex. C-1, Pisciotto WDT, p. 9)
916. For example, in the case of my family ahu it was one thing to have it destroyed once, but since that time it has continued to be desecrated and destroyed on at least seven separate occasions and I can prove at least three of the incidents directly involved University personnel. (Ex. C-1, Pisciotto, WDT, p. 9)
917. In fact, the last ahu we made (that is Ms. Keomailani Von Gogh, Mr. Paul K. Neves and I made together) was not to be found on June 18, 2011. My Auntie's

- burial remains were desecrated at this site also, as she requested that she be brought there after her passing. (See Exhibit C-7, a picture of my family stone, with me in the picture for context) (Ex. C-1, Pisciotto WDT, p. 9)
918. It impacts me as a husband, father, a brother, and uncle, and grand uncle and great grand uncle, Wakea a member of my family and as a Hawaiian National. (Neves, Tr. Tr. August 25, 2011, TR.. p. 111:20-23)
919. This proposal and pull boxes, they are comprehensive desecration of my religious rights, spiritual freewill and growth. The cumulative impacts threaten my survival as a human being and my cultural practices. (Neves, Tr. August 25, 2011, p. 111 24-25, p.112:1-3)
920. The Thirty Millimeter Telescope, TMT, telescope development in this my sacred temple of religious practice will seriously interfere with my ability to adore Mauna Kea. How can we put our shattered lives back together again if these foreign objects are allowed to alter the natural landscape in the natural temple, Mauna Kea? (Neves, Tr. September 30, 2011, p. 42:21-25, 43:1-2)
921. Expert Witness, Dr. J. Kehaulani Kuanui, testified that "...any actual telescopes expansion on Mauna Kea affects all burial grounds already there, whether or not the proposed facility would be directly on top of that burial ground or not." (Kuanui, Tr. August 25, 2011, p. 106:13-17)

NA AHU OF MAUNA KEA

Burial

922. PSCI's recommendation as part of the Cultural Resources Management Plan (CRMP) Section 4.3.2: In view of the documented existence of human burials in the Science Reserve there is a need to develop a burial treatment plan (BTP) to protect all known burial sites. Given the possibility that more human remains will be found inadvertently in the Science Reserve in the future there is also a need to develop an Inadvertent Discovery Plan. (Ex. A-28, FAIS-AP, p. 8-2)
923. Expert Witness, Dr. J. Kehaulani Kuanui, testified that "...any actual telescopes expansion on Mauna Kea affects all burial grounds already there, whether or not the proposed facility would be directly on top of that burial ground or not. TR. August 25, 2011, p. 106:13-17

924. Expert Witness Dr. J. Kehaulani found no TMT documents that address Native Hawaiian Burial concerns. TR. August 25, 2011, p. 104:1-4
925. Although there are known burials in the MKSR, a burial treatment plan has not been prepared even though it has been recommended in PSCI's survey report. (S. Collins, Tr. Aug. 17, 2011, p. 45:11-18)
926. OMKM Interim Director Nagata stated that OMKM has not initiated a burial treatment plan. Nagata DT 8.18.11 p. 52 14-20
927. A burial treatment plan for known burials does not exist, nor does an inadvertent discovery plan. (Ex. A-301, page 7-56)
928. When asked what the management's highest priority actions were, the interim director answered it is setting policies for the visitation of shrines and the stacking of rocks. Ward TR 9.30.11 p 77 13-21, p 78 8-10

DESECRATION

929. If a ranger or representative of Mauna Kea Support Services (MKSS) sees desecration of a site a report is sent to the Office of Mauna Kea Management. Byrne DT 8.18.11 p 191 7-19
930. Reports on incidents such as the destruction of ahu and lele have been reported to OMKM. Byrne DT 8.18.11 p 192 9-18
931. Applicant's expert archaeologist Dr. Collins stated she was aware that traditional and customary practices have been and are still carried out in a number of locations on Mauna Kea. (Ex. A-8, S. Collins DWT, p. 6)
932. Site 16169 was identified in the FAIS-AP as a shrine with a single row of two uprights. (Ex. A-28, FAIS-AP, p. 5-11, 5-12)
933. Site 21447 was identified in the FAIS-AP as a shrine with a single upright. (Ex. A-28, FAIS-AP, p. 5-14)
934. Important information these historic properties -- SHIP No. 16169 and No. 21447 -- within the Mauna Kea Astronomy Precinct was specifically omitted from the direct written testimony of S. Collins. (Ex. A-8, S. Collins DWT; S. Collins, Tr. Aug. 17, 2011, p.36:14 & 19-21)

935. PCSI assigned the function of *Marker* to cultural resources Nos. 1997.07, 2005.03, 2005.05, & 2005.09 that were described as stacked rocks. (Ex. A-28, FAIS-AP, p. 5-20)
936. PCSI assigned the function of *Unknown* to cultural resources Nos. 2005.06, 2005.07, & 2005.08 that were described as upright(s). (Ex. A-28)
937. According to S. Collins, senior archaeologist for PCSI, “...**survey work was not conducted in support of the TMT**. We conducted the survey work as survey work, so any reassessments we made of that site was based on our work and **not based on TMT**.” (S. Collins, Tr. Aug. 17, 2011, p.39:16-20)
938. In August 2005, PCSI was contracted by OMKM to undertake an archaeological inventory survey of the Astronomy Precinct, located within the MKSR. (Ex. A-28, FAIS-AP, p. 1-1 & 1-3)
939. The archaeological field survey crew for the Astronomy Precinct and surrounding lands was limited to PCSI co-principal investigators, Patrick McCoy and Dennis Gosser, and staff, Richard Nees and Reid Yamasato. This field survey crew did not include any Native Hawaiian cultural practitioners. (Ex. A-28, FAIS-AP, p. 1-4)
940. S. Collins, stated she is not a cultural practitioner. (S. Collins, Tr. Aug. 17, 2011, p.17:19)
941. Written sources used by S. Collins to make determinations about Hawaiian cultural traditions are limited to secondary written sources because she does not read or write in the Hawaiian language, unless the primary source is in English. (S. Collins, Tr. Aug. 17, 2011, p.29:4-9)
942. “No universally accepted definitions of site and feature exist in Hawaiian archaeology, and it is unlikely that any ever will because of the architectural complexities of the archaeological landscape in many areas of the Hawaiian Islands, and the different perspectives that archaeologists hold on how the archaeological landscape should be observed and recorded.” (Ex. A-28, FAIS-AP, p. 4-3)
943. “While sites and features can be easily described in terms of formal attributes, there is in reality no dichotomy between form and function, since function is

- inferred from form,...” (Ex. A-28, FAIS-AP, p. 4-3, 4-4)
944. Archaeological classifications are not immutable. They may require revision. (Ex. A-28, FAIS-AP, p. 4-3)
945. Regarding the classification of sites, S. Collins stated, “We did re-evaluate at least one or two sites that we thought might be recent ones, and upon further study we determined they were historic in age. It's not hard and fast. ... So as best we can, we try to make these calls and we try not to make them unless we're reasonably certain. (S. Collins, Tr. Aug. 17, 2011, p. 86:7-20)
946. Due to the uncertainty of archaeologists, a number of sites in MKSR have not been accurately identified and their functions are listed as *Unknown*. (Ex. A-133, DAIS-MKSR, Appendix E).
947. One of the more ambiguous classes of sites are piles or stacks of rocks believed to be markers of some kind or memorials to a person or event. In all but a couple of cases, the actual function is unclear. (Ex. A-133, DAIS-MKSR, p. 5-46)
948. A 1997 SHPD reconnaissance survey began the process of recording what were initially referred to as “locations” but are now being termed “find spots” – a general term referring to man-made remains that are either obviously modern features or **features that cannot be classified by archaeologists with any level of confidence as historic sites because of their uncertain age and function**. (Ex. A-28, FAIS-AP, p. 3-10)
949. “Find spots” are cultural resources. (Ex. A-28, FAIS-AP, p. 5-20)
950. Cultural resources in the MKSR need to be considered in developing appropriate management strategies. (Ex. A-311, CDUA, p. C-4)
951. Figure 3.7: Historic Properties, Traditional Cultural Properties, and Find Spots identified the locations of the find spots in the MKSR. (Ex. A-28, FAIS-AP, p. 3-12)
952. A total of 339 cultural resources (“find spots”) were recorded in the MKSR. (Ex. A-133, DAIS-MKSR, p. ii)

953. The functions of the vast majority (over 250) of these find spots recorded in the MKSR are listed as *Markers*. (Ex. A-133, DAIS-MKSR, Appendix E)
954. The functions of over 65 of these find spots recorded in the MKSR are listed as *Unknown*. (Ex. A-133, DAIS-MKSR, Appendix E)
955. Only about 25 of these find spots recorded in the MKSR have been identified as potentially being modern features. (Ex. A-133, DAIS-MKSR, Appendix E)
956. Some of the find spots could not be definitely dated and could possibly be over 50 years in age and would instead be classified as historic properties. (Ex. A-37, SHPD letter, p. 1)
957. It is highly likely that some of these find spots are actually historic properties, but to demonstrate this would require a more detailed analysis of their morphology and location. (Ex. A-133, DAIS-MKSR, p. ii)
958. The confidence level of archaeologists in assigning functions to many of the sites and component features varies. (Ex. A-28, FAIS-AP, p. 4-4)
959. Some of the find spots appear to be religious sites to archaeologist, S. Collins. (S. Collins, Tr. Aug. 17, 2011, p.57:3-11)
960. Some of the find spots may also be associated with ongoing religious practices, but their function is ambiguous or unclear in most cases to archaeologist, S. Collins. ((Ex. A-8, S. Collins DWT, p. 7)
961. The TMT projects does not meet the fourth criteria prohibiting substantial adverse impact...there is not only historical injury, but continued injury and there will be additional injury if TMT is allowed to be built. (TR. Kealoha Pisciotto, September 30, 2011, p.133:10-16)
962. The TMT project does not meet the fifth criteria because it is not compatible with the locality and surrounding area. The TMT if built will sit right smack dab in the middle of what is called the ritual landscape or the ring of shrines that surround the set of summit cinder cones, also known as Kukahau'ula. These features are part of the Historic District, which contain many traditional cultural properties, which is further affirmed in the Cultural Impact Assessment and cultural reports that have been done throughout the years. (TR. Kealoha Pisciotto, September 30, 2011, p. 133:17-25, 134:1-2)

ACCESS

963. The applicant restricts vehicle access beyond Hale Pohaku. Ex. A35, (TMT FEIS Section 3.16 Cumulative Impacts), p. 3-213
964. The Applicant **requires people to depart the summit region shortly after sunset**, (Emphasis Added) Ex. A35, (TMT FEIS Section 3.16 Cumulative Impacts), p. 3-213

WILDERNESS

965. Natural according to the Webster's Dictionary, means produced or existing by nature: not artificial. Natural in Hawaiian Dictionary among other things means honest, decent, proper, appropriate...rightful... Tr. Paul K. Neves, September 30, 2011, p. 15-19
966. Except for the development of astronomical observatories and its infrastructures - Mauna Kea is undeveloped land. Ching TR 8.16.11 p 51: 1-11, p 52: 12-20
967. The loss of wilderness as a sense of place was evaluated as displacement of undisturbed land as a result of the project. Hayes DT 8.16.11 P 129 9-13
968. Mr Hayes stated that a very large building placed in an area that would otherwise be wilderness would have an effect on a recreational user. Hayes DT 8.16.11 p 129 20-23
969. Dr. Bolte had no knowledge of any ways that space discoveries have improved open space on earth. Bolte TR 8.18.11p 85: 4-7
970. The expanded industrial development of telescope facilities, roads, visitor amenities, and commercial tourism adds a jarring element of distraction to the wilderness landscape. Ward TR 9.30.11 p 79: 5-9
971. The northern plateau of Mauna Kea is not entirely pristine, but the vast landscape, the geologic terrain, the circle of shrines, and the silent interaction of light and shadow, the interplay of mist and snow on the plateau are still a conservation resource treasured by the world. The loss of this resource would be irrevocable, is unacceptable, and is counter to the laws that protect the conservation district. Ward TR 9.30.11 p 80 1-9

972. As a recreational user Ward has experienced the noise of observatory air conditioning, blowers, generators, associated vehicles and industrial activity and has found it disturbing to other recreational users. Exhibit D-1 Ward WDT p 2

973. The presence of other large structures and a road is a reason it is not wilderness. Hayes DT 8.16.11 P 152 3-6

974. When asked how an added increment to cumulative impact in the visual viewplane affected significance, Mr Hayes stated that there's a level of significance and once the level has been met it doesn't matter how much more you add, as it's already significant. Hayes DT 8.16.11 p 134 8-15.

975. An increment is some increase from a baseline. It does not have a specific value. Eiben TR 8.18.11 p. 130: 10-12

PUBLIC HEALTH

976. As the 1993 Apology Resolution correctly recognizes, "the health and well-being of the Native Hawaiian people is intrinsically tied to their deep feelings and attachment to the land[.]" (Joint Resolution, U.S. Public Law 203-150). (Ex. B-20, Kauanui WDT, p. 2)

977. The OCCL's finding that the "affect" (sic) of the TMT's impact on "ancient and contemporary values and resources at Mauna Kea" is not significant is absolutely wrong. The telescopes are a constant reminder of the State's willing degradation of Hawaiian culture, religion, and therefore, the well-being of the Hawaiian people. (Ex. B-20, Kauanui WDT, p. 2)

978. Telescope development, and the economic benefits it entails, comes at a cost to the cultural and religious heritage and practices of the Hawaiian people. By claiming that the economic benefits of a project that is anathema to Hawaiian religion, culture, and well-being outweigh its adverse impacts, the Applicant discriminates in favor of a "public" that is specifically defined to not include Hawaiian religious practitioners. (Ex. B-20, Kauanui WDT, p. 2)

979. Expert Witness, Dr. J. Kehaulani Kauanui found no evidence in the record to demonstrate the health or wellbeing of the Native Hawaiian people was considered in the UH/TMT analysis of the TMT projects impacts on the health and wellbeing of the people of Hawai'i. (Kauanui Tr. August 25, 2011, p. 104: 5-8)

980. "O keia ka manawa" ... now is the time. It has taken me 45 years to find myself as a spirit led being, culturally a kanaka maoli (native person), and politically a Hawaiian National. I can recall my journey beginning with the simple passionate stories from my mother. Her memories of the pain of disenfranchisement, ridicule and survival under the yoke of a foreign master, the United States. These stories were my mothers love for a confused young man of 13 years old . They were told in a style that at times made me cry and laugh but most of all set me on a path to save myself. They were inspirational and clear, deeply spiritual, culturally beautiful and bitterly political. I was broken, angry like many of my brothers and sisters. (Neves Tr. September 30, 2011, p.40:9-22)

981. Expert Witness Dr. Kawika Liu stated that adding to the historical trauma as well as the trauma of seeing ones ancestor, whereas in that persons believe I take this person as a proto-type practitioner, a lineal descendant seeing ones ancestor being desecrated will inevitably impact someone's health...the most basic way that stress of even going through the hearing of it being the system which is not necessarily congruent with that persons believe system may add to anxiety or depression both of which are very under reported in the Native Hawaiian community. (Liu Tr., August 18, 2011, p. 216:1-6, 9-14)

AIR QUALITY AND NOISE

982. "Locally generated contributors to air pollution above the inversion level include vehicle exhaust, chemical fumes from construction and maintenance activities, and fugitive dust from various sources, including vehicles traveling on unpaved surfaces and road grading and construction or other activities conducted on unpaved areas. Rapid dispersion of pollutants is aided by strong winds." (Ex A-308 FEIS, p. 3-182)

983. Climate modeling predicts that the intensity of warming is positively related to altitude. (Ex A-302 CMP NRMP 2.2.23)

984. Increase in CO₂ concentration may increase the competitive edge by fast growing invasive species. (Ex A-302 CMP NRMP 2.2-25)

985. Threats to Mauna Kea's air quality and sonic environment primarily revolve around the presence of humans and their levels of activity. Potential future increases in the number of people visiting, working, and recreating at the UH Management Areas may increase the levels of these impacts. (Ex A-302 CMP NRMP p. 2.1-46)

986. Noise level in the vicinities of the existing observatories varied from 38 dBA to 77dBA Leq, and 40-78 dBA L10, with noise levels at or below 60 dBA Leq beyond a distance of 50 feet from HVAC exhausts. The loudest noise levels of 68 and 77 dBA Leq and 69 and 78 dBA L10, were measured at locations within 15 feet of HVAC exhaust outputs. (Ex A-308 FEIS Section 3.13 Noise p 3-175, 176)
987. Applicant does not define “noise sensitive areas.” (Ex A-308 FEIS Section 3.13 Noise p 3-179)
988. Applicant does not analysis the cultural impacts of noise levels and offers no analysis of noise from culturally significant places like Pu`u Poliahu. (Ex A-308 FEIS Section 3.13 Noise p 3-179)
989. Very little information was found regarding the impact of noise generators on the summit regions. (Ex A-302 CMP NRMP, p. 2.1-46)
990. The Applicant concedes that significant noise would result from construction activities such as excavation, trenching, grading, pouring of foundations, and erection of structures. (Ex A-308, FEIS, p 3-202)
991. Construction of the proposed project would violate noise regulations, such that a noise variance would be required under HAR 11-46-8 for construction of the TMT Observatory. (Ex A-308 FEIS, p 3-202)
992. The Applicant acknowledges the proposed project would generate construction-related noise in the 80-100 dBA range at 50 feet for front-end loaders, backhoes, tractors, scrapers, graders, pavers, trucks, concrete mixers, concrete pumps, cranes, compressors, pneumatic wrenches, jack hammers, and rock drills. Short periods of blasting may also be necessary to dig foundations for the TMT Observatory. (Ex A-308 FEIS, p 3-202)

OVERALL CUMULATIVE IMPACTS

993. A cumulative impact occurs when two or more individual effects taken together are either substantial or they compound or increase other environmental impacts. Thus, cumulative impacts can result from an action that is individually limited but cumulatively has considerable effect upon the environment when added to other individually minor, but collectively significant, actions taking place over time. Ex. A-309, (TMT FEIS Section 3.16 Cumulative Impacts), p.3-207

994. When combined with past actions that led to the existing conditions, **the cumulative impact** of all actions at and near the summit of Maunakea, including the future TMT Observatory, on cultural resources **will continue to be substantial, significant and adverse**... (Emphasis added) Ex. A-309, (TMT Federal Environmental Impact Statement, Section 3.2 Cultural Resources) p. 3-34

DLNR Recognizes Cumulative Impacts

995. The DEIS states that the TMT will result in a small incremental increase in the cumulative impact to cultural resources, we do not necessarily agree that the impact of the project can be characterized as a “small incremental” increase. The TMT will result in a 50 percent increase in astronomy related personnel in the summit area, will consume over 6 acres in its construction, and will result in the movement of almost 100,000 cubic yards of lava material. The project clearly represents more than a “small incremental” increase in environmental and cultural impacts. The DLNR recommends acknowledging and addressing the impacts of the largest telescope in the world to be constructed on Mauna Kea. Laura Thielen, Chair, DLNR Ex A-309 FEIS Vol II p 21-22 of 531

996. It is our view that the effect of astronomy development on cultural resources and on the landscape of Mauna Kea has been significant and adverse. While a project such as the TMT can bring new resources into play that may mitigate certain cultural impacts... we believe the project will increase the level of impact on cultural resources, which remains significant and adverse. Laura Thielen, Chair, DLNR Ex. A-309 FEIS Vol II p 17 of 531

997. The objectives of the National Natural Landmark program are fourfold: to encourage the preservation of sites illustrating the geological and ecological character of the United States; to enhance the scientific and educational value of the sites thus preserved; to strengthen public appreciation of natural history; to foster a greater concern for the conservation of the nation’s natural heritage. Laura Thielen, Chair, DLNR Ex. A-309 FEIS Vol II p 19 of 531

998. The DLNR feels that the visual impacts have been downplayed in the analysis. The analysis does not seem to account for the visual impact of the project on the individuals that move within and between impacted viewplanes, impact on visitors, and more importantly, the impact of viewing a new very large observatory from the perspective within the summit area. Laura Thielen, Chair, DLNR , Ex. A309 (FEIS Vol I) p. 21

999. With regard to the pre-existing disturbance at the proposed TMT site, it should be noted that the site testing equipment” referred to was approved by the DLNR in April 2005 to assess the quality of the area for a new telescope, such as the TMT. The area was small and temporary, and the equipment was removed. Laura Thielen, Chair, DLNR Ex. A309, p. 15 of 531

C. Proposed Mitigation Measures

1000. **One of the most efficient ways of preserving a sensitive ecosystem is to limit future development in the area.** (emphasis added) An additional measure of protection for sensitive habitats can be achieved by prohibiting development of any currently undeveloped pu‘u (or portion thereof) at the summit. Ex A-302 CMP NRMP

1001. All future developments in the Science Reserve and at Hale Pohaku should include mitigation plans for preventing or repairing damage to sensitive habitats caused by construction and development activities. Any habitat that will be permanently removed should be replaced on at least a one-to-one basis, through either creation of new habitat, restoration of degraded existing habitat, or by permanent protection of similar unique habitats. **Mitigation projects on the summit should focus on protection of Wekiu bug habitat from alien species introduction and predation.** Ex A-302 CMP NRMP

1002. **Instead, the Applicant proposes several other mitigation measures, including: paint, reduced size, furniture, and money.**

1003. The CDUA outlines three project-level mitigations for the known visual impacts of the proposed TMT observatory; (1) The location of the TMT project is the primary impact avoidance measure, as it is north of and below the summit.; (2) The design of the observatory also mitigates the visual impact. The dome has been designed to fit very tightly around the telescope, and the telescope has been designed to be much shorter than usual. (3) Also, the coating of the dome will be a reflective aluminum- like coating, which during the day reflects the sky and reduces the visibility of the structure. Ex. A311 (CDUA), p. 2-17, 7-13

1004. Expert Witness Dr. J. Kehaulani Kauanui affirmed that many of the mitigation measures proposed for the TMT Project would not mitigate or off-set the significant adverse impacts to the cultural practices and cultural resources of Mauna Kea to less than significant stating in both written direct testimony and

oral testimony. Ex. B-20

1005. The proposed mitigation measures only serve to trivialize Hawaiian conceptions of Mauna Kea and undermine the political claims we Hawaiians have to that land. Ex.B20 (Expert Witness, Dr. J. Kehaulani Kauanui's WDT), p. 2
1006. [P]ainting a building a different color, silver, adding furnishings that engender a sense of place, while that place is being destroyed, providing cultural sensitivity workshops or other off-site mitigations, including the THINK program, do not offset the project's destruction of the landscape, or the real impacts to the ecosystem and the living cultural practices in any way. (TR. Pisciotta, September 30, 2011, p. 137:7-14)

Paint

1007. The Design Guideline Section of the University of Hawai'i's Master Plan 2000, states; "...off- ridge facilities enclosures use colors and patterns such as the mottled brown tones of the surrounding lava landscape...as much as possible surfaces should be **non-reflective in the visible spectrum** to minimize glare and visibility from distant areas...roof design and material and color selections in conventional structures should merge the facility into the natural landscape. **Reflective Materials are to be avoided.** (Emphasis added) Ex. A21, p. XI-6
1008. Painting the dome of the TMT silver would not reduce the adverse impact to practitioner's ability to use the sky, or to use the constellations, or the sun that are used in ceremonies. Kauanui TR. August 25, 2011, p. 101: 18-24, 102:1-2, 103:1-9

Size

1009. The design of the TMT observatory would utilize a Calotte type dome because of its (a) overall smaller dome size, (b) improved air flow/lower air turbulence around the dome, (c) simplified mechanical components, and (d) better shedding of snow. This is not a mitigation measure for eliminating the visual impact of the TMT dome which would still be 184 feet above the finished grade and with an exterior radius of 108 feet [216 feet in diameter]. Ex. A311 (CDUA), p. 1-8, 7-13)
1010. The proper comparison for mitigation is not between two sizes of the proposed project, but between the natural open space and the proposed size of the project.

1011. For example, before the construction of the first telescope in 1967, people had a 360-degree view of the skyline, of the island, and even the view down the island chain. Before that time commanding views of the sun, moon, stars, constellations and even the great shadow of Mauna Kea could be enjoyed by all. (Tr. Kealoha Pisciotta, September 30, 2011, p.137:15-25)

Furniture

1012. Placing furnishing within the building that engenders a sense of place would not reduce the impacts to cultural and religious practice. Kauanui, Tr., August 5, 2011, p. 102: 3-6
1013. Furnishing items to remind TMT visitors and personnel of the cultural importance of Mauna Kea deeply misunderstands that importance, and will most likely misunderstand those items as well. Nor will allotting a UH-selected group of Hawaiian cultural experts to identify four days of "minimized" TMT activity reconcile the disrespect that has accumulated over the entire history of UH and DLNR management of Mauna Kea lands. Ex.B20 (Expert Witness, Dr. J. Kehaulani Kauanui's WDT), p. 2

Location

1014. Figure 1-3: Mauna Kea Summit Region: Existing Facilities, Features, & Future Development Areas in the CDUA shows that the location of TMT north of and below the summit is due to the fact there is no available room on the summit within the designated Astronomy Precinct due to the existing observatories. This is not a mitigation measure for eliminating the visual impact of the TMT observatory. Ex. A311(CDUA), p. 1-4, 7-13
1015. Placing the TMT on the plateau rather than on the summit (Kukahau`ula) would not reduce the adverse impacts to the cultural and religious practices. Kauanui, TR., August 25, 2011, p. 102:7-18

Money

1016. Providing money does not reduce the adverse impact. Kauanui, TR. August 25, 2011, p.102: 19-25, 103:1-3
1017. "Use of ceded lands for \$1 a year or nominal consideration", "[s]ubleases between the University and the observatories", "[p]roposed new development on

Mauna Kea, including the Thirty Meter Telescope (TMT) and Pan Starrs”, “[c]ommunity benefit package with increased educational benefits”, and “[g]uaranteed employment opportunities for Native Hawaiians and the people on the Island of Hawai‘i” are “Issues and Concerns Beyond the Scope of the CMP” that “policy makers are urged to consider in their broader decision making related to Mauna Kea.” Ex A-301 CMP, p. 2-3.

1018. The Applicant stated that the CMP does not identify the cost of management actions and funding sources to accomplish them. The University is committed to funding them but the applicant could not identify the source of the funding. Nagata TR 8.17.11 p 138 3-15
The Applicant stated that OMKM was unable to hire natural or cultural resources staff because the Legislature was going through budget problems, and they were unable to offer the position. Nagata TR 8.17.11 p 138 16-25, p 139 1-5
1019. The Applicant stated that lease payments would be put into a Mauna Kea Land Fund by the University. Lease rent put into the MK lands fund would be spent by OMKM. Nagata DT 8.18.11 p 24 18-25 p 25 1-12
1020. The Applicant could not state who would be negotiating the lease rent. Nagata DT 8.18.11 p 29 1-8
1021. The Applicant stated there is no legal connection, nor have there been any negotiations between the University and TMT. P 32 1-7
1022. The special Mauna Kea land management funds are not deposited into the general fund for public. Nagata DT 8.18.11 P 63-12-18.
1023. The Mauna Kea Lands Management Fund described and established in Act 132, and funds from the commercial tour operators are deposited into that fund. Nagata DT 8.18.11 p 38 15- 22
1024. In essence, the development on the summit of Mauna a Wākea is a commercial enterprise under the guise of science, educational, and economic opportunities. (Ex. G-1, E. Flores WDT, p. 3)
1025. Applicant asserts that sublease rental payments will be deposited in the Mauna Kea Land Funds special fund and used for management of Mauna Kea’s natural and cultural resources. Nagata DT 8.18.11 p 24 18-25 p 25 1-12

1026. The Mauna Kea Lands Fund special fund is established under section 2170 of Chapter 304A, HRS. (HRS §304A-2170)
1027. Per Chapter 304A, the University is authorized to: “give thorough instruction and conduct research in, and disseminate knowledge of, agriculture, mechanic arts, mathematical, physical, natural, economic, political, and social sciences, languages, literature, history, philosophy, and such other branches of advanced learning as the board of regents from time to time may prescribe and to give such military instruction as the board of regents may prescribe and that the federal government requires...” (HRS §304A-102)
1028. Section 2170 of Chapter 304A, HRS, states in relevant part:
“(b) The proceeds of the special fund shall be used for:
(1) Managing the Mauna Kea lands, including maintenance, administrative expenses, salaries and benefits of employees, contractor services, supplies, security, equipment, janitorial services, insurance, utilities, and other operational expenses”
1029. “Managing the Mauna Kea lands” fails to mention the protection, preservation, or conservation of natural and cultural resources as a purpose of the special fund. (HRS §340A-2170(b)(1))
1030. Mauna Kea Lands Fund does not provide for the management of conservation district resources. (HRS §304A-2170(b)(1))
1031. The Applicant did not present evidence to show that depositing an unknown quantity of money into the Mauna Kea Land Fund will ensure protection, preservation, and conservation of resources in the Mauna Kea conservation district. CITE?
1032. The TMT project has proposed a Community Benefits Package to be administered by The Hawaii Island New Knowledge (THINK) fund board of advisors, **selected by the Applicant**, which would commence at start of construction is the CDUP is not invalidated or stayed by the court. Sanders WDT p 17-18, Sanders Tr. 8.16.11 P 22: 9-14

Management Activities

1033. Applicant’s witness Eiben (communication) writes in Issue 3: There must be an invasive species rapid response eradication plan available for comment. Specifically, the response plan should detail the action that will take place in the

event of a new noxious weed detection, or any ant species detection. All permits required for the plan (especially if herbicides/pesticides are to be used) must be approved and waiting for potential implementation. Ex A-309 TMT FEIS Volume 2

1034. The Project, as required by the CMP NR-2 will reduce the probability for invasive species being introduced to the environment by implementing an Invasive Species Prevention and Control Program. ...will include regular monitoring of the habitat along the Access Way and around the TMT, and eradication of such species when found **using methods that will not impact indigenous resident species.** (emphasis added)TMT FEIS Page 161
1035. Dr. Francis Howarth in the Keck CCH hearing in 2004, Insecticides if used within and outside of the observatories to kill or stun undesirable insects could impact Wekiu bugs feeding on live or dead prey exposed to toxins. It's a windy environment subject to drift. The breakdown or deterioration of the toxin is affected by temperature, and could remain toxic for months in cinder in the cold environment of the summit. (Howarth Rebuttal testimony 2/24/03 p 41-43)Ex D-1 Ward WDT p 17
1036. In response to TMT DEIS, DLNR Chair Laura Thielen (communication) writes in Issue 13: An eradication protocol must be developed **and in place** (along with supporting supplies/trained personnel) if/when establishment of new invasive species is detected. The above tasks should not be completed by untrained personnel. Recommend that a biological technician or biologist be hired by the TMT project to complete surveys. And /or funding be provided to DLNR or an appropriate agency. Ex A-309 TMT FEIS Volume 2

Decommissioning

1037. The Applicant and DLNR staff discuss both decommissioning of the TMT site, as well as decommissioning of other telescopes as methods for mitigating the significant, substantial, adverse impact of the TMT proposal. Ex. A-311, p. 2-7
1038. The statement in the CDUA that potential impacts to cultural, archaeological, and historical resources (omitting biological and natural) would cease upon decommissioning (to the extent practicable) is illogical. No decommissioning project will restore the cultural and natural landscape that has been altered. The impact is irrevocable. D-1 Ward WDT p 24

1039. It was disclosed by Dr. Smith during cross-examination that it would take 100 years for flora to regenerate after the proposed excavation & disturbance at TMT site. (C. Smith, Tr. Aug. 16, 2011, p. 185:9-15)
1040. The University claims there will be fewer telescopes when the lease expires, but the CMP decommissioning plan leaves specifics regarding the extent of site restoration undefined. As a result, the costs and risks associated with decommissioning are difficult to gauge. Ward TR 9.30.11 p 78 11-20
1041. Decommissioning may depend on the type of substrate material used in the construction of an observatory, and removal may be nearly impossible. Nagata Tr 8.17.11 p 191 14-17
1042. The Applicant was unable to identify which telescopes slated for decommissioning would be removed or capped. Nagata Tr 8.17.11 p 192 11-20
1043. The Applicant could not say if the UH Board of Regents would be responsible for making the decision regarding the type of decommissioning. Nagata Tr 8.17.11 p 193 1-13
1044. The Applicant confirmed that the Decommissioning Plan envisioned fewer telescopes on the mountain. Nagata Tr 8.17.11 p 193 14-21
1045. In compliance with the existing master lease, if there is no new lease, all telescopes would be decommissioned by 2033. Nagata Tr 8.17.11 p 194 16-19
1046. There have been no negotiations, now or in the past, to extend the current lease. Nagata Tr 8.17.11 p 194 20-24
1047. The Applicant did not know if decommissioning would require an additional CDUP. Nagata Tr 8.17.11 p 196 14-19
1048. The TMT project does not have a Decommissioning Plan. Nagata Tr 8.17.11 p 194 16-19
1049. The DLNR's 1977 Mauna Kea Management Plan required that full funding be set aside for both construction and decommissioning of permitted telescopes, but no such requirement has been put in place for the TMT. Ward Tr 9.30.11 p 78 20-24

1050. A notice of intent to decommission the telescope must be given five years before the expiration of the lease. Exh A-313 Staff Report Feb 25, 2011, p.18
1051. All decommissioning activities shall be completed by the end of the master lease, if no new lease is granted, the observatories will need to be removed and the site restored no later than the end of the master lease. Exh A-313 Staff Report Feb 25, 2011, p.12
1052. The Applicant referenced the decommissioning of telescopes as a mitigation measure for the existing significant, substantial, adverse cumulative impact of telescopes activities on Mauna Kea.
1053. DLNR staff relied on the decommissioning of telescopes as a basis for recommending approval of the TMT CDUA.
1054. At the BLNR public hearing on February 25, 2011, OCCL staff said: “In light of **what currently exists on the mountain** and what **actions might be taken** in the future -- a reduction in telescopes, additional resource studies, site restorations. We believe the project will not cause substantial impacts to cultural or natural resources” (Ex. B-33, page 7)
1055. Decommissioning of a telescope is not within the scope of the CDUA for the TMT. Ex A-311 CDUA

CONCLUSIONS OF LAW

I. THE TMT PROJECT WOULD HAVE SIGNIFICANT EFFECTS

1056. The TMT project satisfies the regulatory definition of “significant effect” because it proposes to construct a new 18-story, 5-acres industrial structure on undeveloped land. The foreseeable significant harm of the proposal include significant viewplanes interrupted, open space lost, the historic district degraded, traditional and customary practices violated, and increased risk to groundwater resources.

A. TMT meets regulatory definition of “significant effect”

1057. HRS 343-2 defines "Significant effect" to mean “the sum of effects on the quality of the environment, including actions that irrevocably commit a natural resource, curtail the range of beneficial uses of the environment, are contrary to

- the State's environmental policies or long-term environmental goals as established by law, or adversely affect the economic welfare, social welfare, or cultural practices of the community and State.”
1058. The development of observatories within the Astronomy Precinct substantially altered the appearance of the summit, and the presence of these observatories continues to affect the performance of religious and cultural practices. Ex. A-309, (TMT FEIS Section 3.16 Cumulative Impacts), p.3-225
1059. From a cumulative perspective, the impact of past and present actions on **cultural, archaeological, and historic resources** is **substantial, significant, and adverse**; the impacts would continue to be substantial, significant and adverse with the consideration of the Project and other reasonably foreseeable future actions. (Emphasis added) Ex. A-309, TMT FEIS, p. S-8
1060. From cumulative perspective, the impact of past and present actions on the **traditional and customary practices of Native Hawaiians** has been **substantial, significant and adverse**; the impacts would continue to be substantial, significant, and adverse with the consideration of the Project
1061. Project specific impacts would have a significant effect on the natural, cultural, archaeological, and historic resources.
1062. Project specific impacts would have a significant effect on the continued practice of traditional and customary Native Hawaiian practices. (FoF # 103-107,
1063. The Applicant concedes that the project would add a new visual element to the summit area of Mauna Kea, where the visual impact of past actions on Mauna Kea, such as the 11 observatories currently located within the Astronomy Precinct, is already considered substantial, significant and adverse. Ex A-308 FEIS Section 3.5 Visual and Aesthetic Resources p 3-101
1064. The Applicant concedes that construction of the TMT would destroy natural wildlife habitat that would need 100 years to recover.
1065. Because the proposal includes increased industrial activity over known aquifers, the TMT project would increase the likely damage to water resources on Mauna Kea. (FoF #518-520, 525, 543).
1066. The existing potential risk to water resources on Mauna Kea is significant. (FoF #521-542).
1067. Given the high permeability of the cinder on Mauna Kea and the existence of five aquifer under the summit area, the project specific and cumulative impact

of telescope activity on water resources is significant, substantial, and adverse, and poses a risk to public health (FoF #150-161).

1068. Based on the findings of fact above, the TMT may have a significant effect on water resources, rare, native species, and air quality.

B. Applicant Misstates the Standard for Assessing Significant Effect

1069. When asked how an added increment to cumulative impact on the visual viewplane affected significance, Mr. Hayes stated there is a “threshold” level of significance and once the threshold is passed it doesn’t matter how much more significant effect a project contributes because the existing status is already significant. “There is no significant-plus”. Hayes Tr 8.16.11, page 134:8-15; p 99:7-10, 15-16; P 120:9-14
1070. Moreover, Ms. Nagata stated that while there is an existing substantial, significant impact on resources at and around the summit, the project itself would not, could not, add any more to that. Once an effect is significant, it is not possible to make it any more significant. And thus, she concludes the project itself will not have significant impact. Nagata Tr. 8.18.11 P 71 15-22
1071. However, Mr. Hayes concedes the mountain’s resources suffer significant effects today and those will remain cumulatively significant in the future. Given that the current level of impact to the natural environment on Mauna Kea - i.e., without the project - has been assessed to be significant, when the project is combined with the existing conditions, the cumulative visual impact of development on and near the summit of Mauna Kea will continue to be significant. Hayes Tr 8.16.11 p 96:6-12; p 122 5-7
1072. Hawaii Administrative Rules 11-200-12(b) says “In determining whether an action may have a **significant effect on the environment**, the agency shall consider every phase of a proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action. In most instances, **an action shall be determined to have a significant effect on the environment if it:**
- a. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;
 - b. Curtails the range of beneficial uses of the environment;
 - c. Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders;
 - d. Substantially affects the economic welfare, social welfare, and cultural practices of the community or State;
 - e. Substantially affects public health;

- f. Involves substantial secondary impacts, such as population changes or effects on public facilities;
- g. Involves a substantial degradation of environmental quality;
- h. Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;
- i. Substantially affects a rare, threatened, or endangered species, or its habitat;
- j. Detrimentially affects air or water quality or ambient noise levels;
- k. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters;
- l. Substantially affects scenic vistas and viewplanes identified in county or state plans or studies; or,
- m. Requires substantial energy consumption.”

1073. HAR 11-200-2 defines “Cumulative impact” to mean “the impact on the environment which **results from the incremental impact** of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”

1074. Based on HAR 11-200, the analysis to determine whether a project would have a significant effect is not based on a threshold, but on the extent accumulated impacts.

1075. Based on the findings of fact above, however, the foreseeable impacts of the TMT proposal are both individually and cumulatively significant.

1076. The mitigation measures offered do not directly address threats to water resources, cultural practices, obstructed viewplanes, among the many significant impacts identified in these findings of fact.

II. SIGNIFICANT EFFECTS OF TMT PROJECT NOT MITIGATED

1077. The Applicant and Project entity propose a wide range of mitigation measures to reduce the admitted significant effects of the TMT project. These mitigation measures, however, fail to reduce the significant effects of the specific project, as well as the cumulative impact of telescope activity on Mauna Kea, to a level that is less than significant.

1078. The Applicant has the burden of proof in demonstrating that the significant effects of the proposed project are mitigated to a level that is less than significant.

A. Standards for Mitigation Measures Not Met

1079. HAR § 11-200-17 (M) provides that:
- n.
- “The draft EIS shall consider mitigation measures proposed to avoid, minimize, rectify, or reduce impact, including provision for compensation for losses of cultural, community, historical, archaeological, fish and wildlife resources, including the acquisition of land, waters, and interests therein. **Description of any mitigation measures included in the action plan to reduce significant, unavoidable, adverse impacts to insignificant levels, and the basis for considering these levels acceptable shall be included.** Where a particular mitigation measure has been chosen from among several alternatives, the measures shall be discussed and reasons given for the choice made. Included, where possible and appropriate, should be **specific reference to the timing of each step proposed to be taken in the mitigation process, what performance bonds, if any, may be posted, and what other provisions are proposed to assure that the mitigation measures will in fact be taken.**”
1080. In federal law, 40 CFR § 1508.20, “mitigation” is defined as
- i. “(a) Avoiding the impact altogether by not taking a certain action or parts of an action.
- (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- (e) Compensating for the impact by replacing or providing substitute resources or environments”
1081. To be relevant mitigation must be focused on the restoration of the adverse impact caused by the project. There must be a direct nexus between the harm caused by the proposed project and the mitigation effort promised. See, Morimoto v. Bd. of Land & Natural Res., 107 Haw. 296 (2005)

1082. In addition, there must be an assurance that compensation offered will result in minimizing the impacts caused by the project. See, Morimoto v. Bd. of Land & Natural Res., 107 Haw. 296 (2005) (finding U.S. government was capable of creating new, more preferable palila habitat, where the project proposed to destroy less preferable habitat; the requirement was legally enforceable).

1083. Applicant UH-Hilo is legally responsible for all obligations and/or liabilities resulting from a finally approved CDUP.

1084. TMT is not a legal party or participant to this CDUA process.

Because the record provides no evidence of an Operational Agreement or any type of legal document between the Applicant and TMT, there is no mechanism for BLNR to require the TMT Corporation comply with permit terms and conditions.

1085. "No application for any proposed facility shall have final approval without the applicant having first filed, with the Board, adequate security equal to the amount of the contract to construct the telescope facilities, support facilities and to cover any other direct or indirect costs attributed to the project. ..." The 1977 Mauna Kea Plan - II (C)

1086. The CDUA does not include any indication that "adequate security equal to the amount of the contract to construct the telescope facilities" has been filed.

1087. The findings of fact in this case do not demonstrate that the Applicant has satisfy the requirements for mitigation of significant effects.

“Strong Management Framework” Inadequate

1088. The Applicant and DLNR staff cite the “Comprehensive Management Plan” as one of the main reasons the significant impacts of the TMT will be mitigated to a level that is less than significant. The conclusion of the Applicant and staff is not supported by the record.

1089. Before the Intermediate Court of Appeals, the Applicant described the CMP as a plan that does “not take action” and is no different from the previous activities the University has undertaken on the UH managed lands.

1090. As the Findings of Fact above demonstrate, the CMP is incomplete. It identifies hundreds of “needs” without any enforceable timelines or benchmarks

to ensure those identified needs are met. This includes a burial treatment plan, invasive species control plan, and hazardous spill protocols. (FoF # 466, 467).

1091. The CMP is concerned with only a limited subset of the overall conservation district of Mauna Kea and fails to provide limitations on the number and size of future telescope projects. (FoF #461-465).

1092. OMKM has no natural resources management staff. Funds for this purpose were not provided by the legislature. Dependence on funds to be provided by the legislature in this cash-strapped economy demonstrates the failure of the Department of Land and Natural Resources to follow the law requiring fair market rent for the use of our land; these funds could be used in part to fund appropriate management. Ward TR 9.30.11 p 75 12-20

1093. Therefore, the CMP does not provide a strong management framework that ensures the significant impacts of the TMT and all existing telescope activity are reduced to a level that is less than significant.

Reduced Dome Size

1094. The Applicant concedes that the visual and cultural impacts of the TMT are significant, substantial, and adverse.

1095. Applicant demonstrated that the proposed TMT could have been larger if the dome-to-aperture ratio of current telescopes was followed. (FoF #500, Ex. A-311, p. 1-8)

1096. The conclusion that the TMT project could have been bigger does not demonstrate that the admitted significant impacts of the project would be reduced to a level that is less than significant.

1097.

Painting TMT silver

1098. The Applicant proposes to paint the TMT silver to reduce the visual impact of the project. Ex. A-27, p. 33-40

1099. The findings of fact demonstrate that painting the project silver will likely cause a “lighthouse effect” for makai-to-mauka views of the mountain and serious obstacle to open space views from the summit, regardless of its color.

1100. The Applicant concedes that the visual and cultural impacts of the TMT are significant, and the finding of facts above demonstrate that significant impact is substantial and adverse.

1101. The Applicant offers no evidence that painting the structure silver will reduce those significant, substantial, and adverse impacts to a level that is less than significant.

Mauna Kea Lands Fund is Not Mitigation

1102. Applicant asserts that sublease rental payments will be deposited in the Mauna Kea Land Funds special fund and used for management of Mauna Kea's natural and cultural resources.
1103. The sublease rent amount has not been negotiated, thus it is unknown how much money would be deposited into the fund.
1104. The Mauna Kea Lands Fund special fund is established under section 2170 of Chapter 304A, HRS. (HRS §304A-2170)
1105. Per Chapter 304A, the University is authorized to: "give thorough instruction and conduct research in, and disseminate knowledge of, agriculture, mechanic arts, mathematical, physical, natural, economic, political, and social sciences, languages, literature, history, philosophy, and such other branches of advanced learning as the board of regents from time to time may prescribe and to give such military instruction as the board of regents may prescribe and that the federal government requires..." (HRS §304A-102)
1106. Section 2170 of Chapter 304A, HRS, states in relevant part:
“(b) The proceeds of the special fund shall be used for:
(1) Managing the Mauna Kea lands, including maintenance, administrative expenses, salaries and benefits of employees, contractor services, supplies, security, equipment, janitorial services, insurance, utilities, and other operational expenses”
1107. “Managing the Mauna Kea lands” fails to mention the protection, preservation, or conservation of natural and cultural resources as a purpose of the special fund. (HRS §340A-2170(b)(1))
1108. The Applicant did not present evidence to show that depositing an unknown quantity of money into the Mauna Kea Land Fund will ensure protection, preservation, and conservation of resources in the Mauna Kea conservation district.
1109. Because the Mauna Kea Lands Fund does not provide for the management of conservation district resources, depositing money into this fund does not satisfy the requirements for direct and enforceable mitigation of the existing and

anticipated significant, substantial, and adverse impact of telescope activity on Mauna Kea.

1110. Therefore, as the findings of fact demonstrate, the record does not support the Applicant's conclusion that money by itself will reduce the significant impact to a level that is less than significant.

Renaturalizing Poliahu Road, Monitoring Wekiu

1111. The Applicant offers to renaturalize the dirt road leading up Pu'u Poliahu and monitor the Wekiu population for a set period of years. Ex. A-311
1112. Pu'u Poliahu is not within the scope of the CDUA before the BLNR. Thus mitigation actions related to Pu'u Poliahu are "off-site" mitigations and do not directly address the impact caused by the proposed project.
1113. Erasing a dirt road is not commensurate with structure of an 18-story, 5-acre industrial building on an undeveloped plateau.
1114. Monitoring Wekiu populations is not a mitigation measure because it does nothing to offset or compensate for the Wekiu habitat that would be lost if the TMT were built.
1115. "Mitigation plans to monitor conditions and develop data in the future are insufficient. Oregon Natural Desert Assoc. v. Singleton, 47 F. Supp. 2d 1182, 1194 (D. Or. 1998).

Community benefits package not relevant to resource protection or restoration

1116. The University asserts that the TMT Observatory Corporation will commit a \$1 million annually to various workforce development and public education efforts.
1117. The Applicant provides no rule or statute authorizing the BLNR to consider such payments in lieu of strict compliance with the Department's permitting requirements, statutory mandates, and constitutional obligations.
1118. Donation of funds for community benefit purposes is outside the scope of the CDUA at issue in this hearing and goes beyond the scope of the BLNR's authority to manage and protect natural and cultural resources. Thus, these

donations do not factor into the decision whether this permit application should be granted.

Decommissioning

1119. Decommissioning of a telescope – either a current telescope or of the TMT should it be built – is not within the scope of the CDUA at issue in this hearing.
1120. The possibility that a telescope may be decommissioned in the future – without facts about the extent and method of that decommissioning or the permit vehicle to ensure it happens – is pure speculation that cannot serve as a basis for the BLNR’s decision on the contents of CDUA-HA-3568.
1121. The University asserts that it “envision[s]” less telescopes on Mauna Kea in the future. Indeed, by the terms of General Lease S-4191, there would be no telescopes on Mauna Kea by 2033.

III. TMT FAILS TO SATISFY THE EIGHT CRITERIA FOR A CONSERVATION DISTRICT USE PERMIT

1122. As outlined below, the TMT project cannot satisfy the eight criteria requirements for issuing a CDUP under HAR 13-5-30. The TMT is not consistent with the purpose of the conservation district, the resource subzone, or requirements of the CZMP. Moreover, it is an acknowledged and unmitigated source of substantial adverse impact that is not compatible with, nor improves upon the wide-open space of the northern plateau. The TMT would further subdivide the conservation district for the purpose of intensifying land use. Lastly, it poses a further risk to the public’s health and welfare. For these reasons, the BLNR cannot permission to build the TMT in the conservation district of Mauna Kea.

A. TMT fails to satisfy HAR 13-5-24

1123. HAR 13-5-24 states “Identified land uses in the resource subzone.
- o. R-3 Astronomy Facilities
 - p. (D-1) Astronomy facilities under an approved management plan.”
1124. HAR 13-5-2 “Management plan means a comprehensive plan for carrying out multiple land uses.”

1125. Mauna Kea Anaina Hou, et al. v. BLNR, et al, Civ. No. 4-1-397, (3rd Cir. Haw. Jan, 19, 2007)) states:

q. "...the 1995 Plan did not provide for the scope and coverage for development of the astronomy facilities on Mauna Kea, as did the 1985 Plan. It is also apparent by review of its contents that the 1995 management plan would not support the CDUA for the project since the 1995 management plan was virtually silent on the matter of future development of astronomy related facilities on Mauna Kea."

1126. The findings of fact above demonstrate that the UH CMP fails to satisfy the requirements for a comprehensive management plan. (FoF #461-467)

Not comprehensive

1127. The UH CMP concerns only "UH Managed Areas," not the entire conservation district of Mauna Kea, which stretches from approximately the 6,000-foot elevation to the summit.

1128. The Third Circuit Court held that the resource to be protected by the comprehensive management plan is the summit of Mauna Kea.

1129. We now know that the 1977 Management Plan for Mauna Kea (written by DLNR staff) identified the scope of the Mauna Kea conservation district as from the summit down to the 6,000-foot elevation and including all lands from the summit to Saddle Road, including the Mauna Kea Forest Reserve and Game Management Area, and Kaohe Game Management Area. (Ex. D-3, page 1)

1130. Indeed, the admitted confusing and complex management work outlined in the CMP would be better served by bringing all management of Mauna Kea under one comprehensive document developed by DLNR and implemented by DLNR.

No quantitative limit on development

1131. The question of future telescope development, and especially the issue of the TMT proposal, were deemed by the authors of the UH CMP as outside the scope of the document. This is to say that the UH CMP is literally silent on the matter of future development of astronomy related facilities on Mauna Kea.

1132. While the UH CMP addresses general questions of location for possible future development, it provides no limit on the number or size of future telescopes. As such, it would be possible under the UH CMP for every inch of the Astronomy Precinct to developed with astronomy related facilities. This is to

say, the UH CMP does not protect the resources of the Mauna Kea conservation district from the obvious substantial adverse impact of such an outcome.

Not enforceable

1133. The Applicant admitted before the Intermediate Court of Appeals that the UH CMP does “not take action.”
1134. The findings of fact above indicate that the UH CMP does not set out any timelines, thresholds, or triggers to ensure that any of the 103 management activities outlined in it will actually happen. This is to say, there is no mechanism for ensuring the UH CMP is ever more than an “unimplemented plan.”
1135. Without enforceable requirements that actually ensure the protection of Mauna Kea’s resources, the UH CMP is not the “strong management framework” the Applicant asserts will remedy the longstanding substantial adverse impact of telescope activities on the resources of Mauna Kea.
- 1136.

B. TMT Proposal Not Consistent with CDUA Permit Criteria

1137. “HAR 13-5-30 Permits, generally”
(b) generally, “land uses shall not be undertaken in the conservation district.”
- “(c) In evaluating the merits of a proposed land use, the department or board shall apply the following criteria:
- (1) The proposed land use is consistent with the purpose of the conservation district;
 - ii. (2) The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur;
 - iii. (3) The proposed land use complies with provisions and guidelines contained in chapter 205A, HRS, entitled Coastal Zone Management,” where applicable;
 - iv. (4) The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region;

- v. (5) The proposed land use, including buildings, structures and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels;
- vi. (6) The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable;
- vii. (7) Subdivision of land will not be utilized to increase the intensity of land uses in the conservation district; and
- viii. (8) The proposed land use will not be materially detrimental to the public health, safety, and welfare.

The applicant shall have the burden of demonstrating that a proposed land use is consistent with the above criteria.”

1. Not Consistent with Purpose of Conservation District HAR 13-5-30(c)(1)

1138. HAR 13-5-30(c)(1) states: conservation districts are formed “for the purpose of conserving, protecting and preserving the important natural resources of the State through appropriate management to promote their long-term sustainability and the public health, safety, and welfare.” See also, HRS §205-2(e).
1139. The Applicant proposes that an 18-story, five-acre industrial structure in a currently undisturbed natural area.
1140. The Applicant interprets the purpose of the conservation district as being “appropriate management” and contends that the “strong management framework” of the UH CMP satisfies this permit criteria.
1141. The above findings of fact fail to support the conclusion that the UH CMP is a “strong management framework.”
1142. In addition, even if the UH CMP did provide strong management, that alone does not satisfy this permit requirement. As written, HAR 13-5-30(c)(1) requires that the proposed land use be consistent with “conserving, protecting, and preserving ... important natural resources.” The TMT project would destroy many of those resources to the point of jeopardizing federal designations, e.g. National Natural Landmark. Such significant impacts as these would require the

Applicant to engage in extensive mitigation measures to correct for the harms caused by the proposed project. Thus, the proposed land use is not consistent with the purpose the of the conservation district.

1143. Because the TMT cannot meet this first criterion, this CDUA cannot be approved.

1144.

2. Not Consistent with Subzone Designation HAR 13-5-30(c)(2)

1145. According to HAR 13-5-13(a), “[t]he objective of this [Resource] subzone is to develop, with proper management, areas to **ensure sustained use** of the natural resources of those areas.” Id. (emphasis added).

1146. HAR 13-5-2 defines “natural resource” to mean “resources such as plants, aquatic life and wildlife, cultural, historic, and archeological sites, and minerals.”

1147. HAR 13-5-2 also defines “Scenic area” to mean “areas possessing natural, scenic, or wildland qualities.”

1148. HAR 13-5-24 identifies “astronomy facilities under an approved management plan” as one of the allowable uses in the Resource Subzone.

1149. For an identified use to be permitted, it must demonstrate that it is consistent with the sustained use of the natural resources of the area.

1150. The Applicant fails to meet this burden. The findings of fact above demonstrate that the proposed project would have a substantial adverse affect on the natural resources of Mauna Kea as a whole and the northern plateau specifically.

1151. The mitigation measures offered by the Applicant fail to demonstrate that the direct and undisputed harms of the proposed project will be reduced to a level that is less than significant. The Applicant fails to satisfy criterion two and thus CDUA-HA-3568 cannot be granted.

1152.

3. Not Consistent with CZM Provisions in HRS 205A HAR 13-5-30(c)(3)

a) TMT is in the Coastal Management Area

1153. The TMT proposal must comply with the provisions of the CZM program as outlined in HRS 205A.

1154. HRS 205A-1 Definitions. "Coastal zone management area" means "all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the United States territorial sea."
1155. The TMT is proposed for Mauna Kea on the Island of Hawaii, and thus is within "all lands of the State."
1156. The proposed TMT is not consistent with two objectives of the CZM Program.

b) TMT undermines CZM Objective to protect historic resources

1157. HRS 205A-2 Coastal zone management program; objectives and policies.
(b) Objectives.
(2) Historic resources;
(A) Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.
1158. The above findings of fact demonstrate the significant risk telescope activity, including the proposed TMT, poses to the integrity of the historic district of Mauna Kea. The Applicant has offered no evidence that the proposed mitigation measures will reduce the known significant effect of telescope activity on the historic resources of Mauna Kea to a level that is less than significant.
1159. Because the proposed TMT would contribute to the existing "significant, substantial, and adverse" impacts of telescopes on Mauna Kea, CDUA-HA-3568 does not comply with HAR 13-5-30(c)(3) and therefore cannot be granted.

c. TMT undermines CZM Objectives to protect scenic and open spaces

1160. HRS 205A-2 Coastal zone management program; objectives and policies.
(b) Objectives.
(3) Scenic and open space resources;
(A) Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.
1161. The record is replete with evidence of the significant effect the proposed TMT would have on the scenic open spaces and important viewplanes of the

northern plateau on Mauna Kea. The Applicant's Visual Impact Analysis Report concedes that the visual impact of the proposed project would be significant, although it is criticized because it "downplays" the visual impacts of the project and misidentifies important viewplanes affected by the proposed project (e.g. Pu'ukohala Heiau).

1162. Because the proposed TMT would contribute to the existing "significant, substantial, and adverse" impacts of telescopes on Mauna Kea, CDUA-HA-3568 does not comply with HAR 13-5-30(c)(3) and therefore cannot be granted.

4. Contributes to Existing Substantial Adverse Impacts HAR 13-5-30(c)(4)

1163. HAR 13-5-39(c)(4) states:
"The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region."
1164. The Applicant asserts that because the TMT project would have only an incremental impact, it is not substantial and therefore meets criteria four. Nagata Tr. 8.18.11 P 70 17-22
1165. As outlined, *supra*, this is a misstatement of the standard for assessing significant effect.
1166. The findings of fact are replete with evidence – and the Applicant concedes – that the TMT project would contribute to the existing substantial adverse impacts suffered on Mauna Kea.
1167. The visual impacts of the proposed TMT will be substantial and adverse.
1168. The geological impacts of the proposed TMT will be substantial and adverse, and will jeopardize the listing of Mauna Kea as a National Natural Landmark.
1169. The risks of groundwater contamination may be substantial and adverse, but have not been adequately assessed.
1170. The Petitioners demonstrated that the Applicant has underestimated the level of significant effect likely to be caused by the construction of the TMT project.
1171. The impact to the continuing and constitutionally protected traditional and customary practices of Native Hawaiians would be severe.

1172. The record demonstrates that:
- A. the entire conservation district of Mauna Kea is a known sacred landscape with viewplanes associated with navigation and many ancient trails (FOF #103)
 - B. the historic properties in the Mauna Kea Science Reserve are “are of importance to Native Hawaiians because they possess traditional cultural significance derived from associated cultural practice and beliefs,” (FOF #103)
 - C. the traditional and customary and religious practices include the collection of water, depositing piko, burial ceremonies, and religious observances. (FOF #104)
 - D. these ancient practices continue today and have evolved into contemporary practices (FOF #104)
 - E. the construction of ahu, releasing of cremated remains, and other contemporary cultural practices evolved from ancient practices and **considered reasonable practices**. (FOF #105, #106)
 - F. these practices are of the class of practices protected by Article XII, sec. 7 of the Constitution and the related caselaw. (FOF #107).
1173. Further injury to these practices is not allowed under the law.
1174. The Applicant has not demonstrated that the mitigation measures proposed for the project would bring the existing wide range of significant effects from telescope activity on Mauna Kea down to a level that is less than significant.
1175. The proposed project will have a substantial adverse impact on existing natural resources within the surrounding area, community or region. These impacts will not be mitigated to a level that is less than significant. Thus, the Applicant has failed to meet its burden on the criterion, and the CDUA-HA-3568 cannot be granted.

5. Incompatible with the Surrounding Environment HAR 13-5-30(c)(5)

1176. HAR 13-5-30(c)(5) states:
“The proposed land use, including buildings, structures and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels.”
1177. The Applicant asserts both that:

- the TMT project would be removed from Pu`u Kukauhau`ula and thus not significantly affect traditional and customary practices or the historic significance of that area, and
- the TMT project is close to Pu`u Kukauhau`ula, where the majority of telescope construction has occurred and thus is consistent with the surrounding environment.

Both cannot be true.

1178. The undisputed conclusion that telescope activity on Mauna Kea has a “significant, substantial, and adverse” impact on the resources of the conservation district is an indication that the built structures on Mauna Kea were not consistent with the surrounding environment to begin with.

1179. The proposed location for the TMT project is the northern plateau of Mauna Kea and is designated for the purposes of the CDUA process as “Area E.”

1180. The above findings of fact demonstrate that Area E and the environment immediately surrounding it is undeveloped land.

1181. The findings of fact also demonstrated that viewplanes from the north ridge of the summit and from Pu`u Poliahu that include Area E currently have no built structures or man-made interference.

1182. The Applicant has not demonstrated that the TMT is consistent with the surrounding environment of Area E and thus this criterion is not satisfied and the CDUA-HA-3568 cannot be granted.

6. Undermines Open Space and Natural Beauty of Mauna Kea HAR 13-5-30(c)(6)

1183. HAR 13-5-30(c)(6) states:

“The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable”

1184. The above findings of fact demonstrate that the proposed TMT does not improve upon or preserve the open space and natural beauty of Mauna Kea.

1185. The staff recommendation rationalizes the approval of the TMT project on the expectation of payment, bemoaning that “management costs money.” (Ex. B-33).

1186. The Applicant and staff cite no statute or regulation that authorizes the BLNR to circumvent this requirement in exchange for money.
1187. The payment of market-based lease rent, as required by HRS 171-17 and -18, is separate and secondary to compliance with the threshold requirements for issuing the CDUP. Indeed, if that were not the case, the Applicant could always offer to pay some amount of money to satisfy any permit requirement that is otherwise violated by the nature of the proposed land use.
1188. Moreover, there is no evidence in the record to demonstrate the amount of money the TMT Observatory Corporation will pay.
1189. The Applicant also failed to demonstrated that whatever amount the TMT project proponents would pay in rent is sufficient to provide for the management actions needed to mitigate the substantial adverse impact of the TMT project.
1190. The Applicant failed to demonstrate that it has the expertise and ability to meet the management needs of the resources on Mauna Kea now, much less after the TMT would be built.

7. TMT Project is Inconsistent Prohibition on Subdivision HAR 13-5-30(c)(7)

1191. HAR 13-5-30(c)(7) states that “subdivision of land will not be utilized to increase the intensity of land uses in the conservation district.”
1192. HAR 13-5-30(c)(7) states that “subdivision of land will not be utilized to increase the intensity of land uses in the conservation district.”
1193. HAR 13-5-2 defines “subdivision” to mean “a division of a parcel of land into more than one parcel.”
1194. Webster’s Merriam Dictionary defines “division” as something that “divides, separates or marks off,” as in a “border.” <http://www.merriam-webster.com/thesaurus/division>.
1195. Based on the findings of fact outlined above, the University has subdivided its leased parcel in several ways for the purpose of intensifying land uses in the conservation district of Mauna Kea.

A. The Astronomy Precinct is a “Subdivision” in violation of HAR 13-5-30(c)(7)

1196. The findings of fact above demonstrate that the University divided its 11,088-acre lease into two parts: the Astronomy Precinct and a Natural/Cultural Preservation Area.
1197. The findings of fact also demonstrate that the University divided the smaller Astronomy Precinct from the remainder of its leased lands to ensure that future “telescope development was limited to the Astronomy Precinct.”
1198. This is a division of a parcel into two or more parcels for the purpose of intensifying land uses in the conservation district, which is specifically prohibited by HAR 13-5-30(c)(7).
1199. The undisputed fact that currently the cumulative impact of past, present, and reasonably foreseeable telescope activity is considered significant, substantial, and adverse further supports this conclusion of law.
1200. Issuance of CDUA-HA-3568 would further the improper subdivision and intensified land use in the Mauna Kea conservation district, which is not allowed by the administrative rules.

B. TMT Sublease Would be a “Subdivision” of Land in Violation of HAR 13-5-30(c)(7)

1201. The above findings of fact demonstrate that while the terms of a sublease to the TMT are not in the record, a sublease would be required by the University and the telescope operator.
1202. The above findings of fact demonstrate that a sublease to the TMT would be similar to past subleases issued for telescope facilities on Mauna Kea.
1203. Based on the above findings of fact, past subleases for telescope facilities granted telescope operators such exclusive use of land so as to effect a division of the University’s parcel of land into more than one parcel. That the sublease would not be necessary without the construction of a land use in the conservation district, demonstrates that the division of the parcel is for the purpose of intensifying land use in the conservation district.
1204. Approving the TMT CDUA would result in a division of land to intensify land uses in the conservation district, which is prohibited by HAR 13-5-30(c)(7).

8. Materially Detrimental to Public Health Safety and Welfare HAR 13-5-30(c)(8)

1205. HAR 13-5-30(c)(8) states:
- r. “The proposed land use will not be materially detrimental to the public health, safety, and welfare.”
1206. The findings of fact above – and the record as a whole – is replete with evidence that the desecration of Mauna Kea is a source of immense pain for many people, especially Native Hawaiians.
1207. These facts have been known to the University at least since 2005 and the publication of Kepa Maly’s Oral History of Mauna Kea.
1208. The Applicant offered no evidence to demonstrate that the pain suffered by some Native Hawaiians from the desecration of Mauna Kea does not undermine the health and well-being of Native Hawaiians.
1209. The Petitioners presented evidence, not refuted by the Applicant, that the pain some Native Hawaiians suffer due to the desecration of Mauna Kea could be connected to the poor public health standards of Native Hawaiians.
1210. Moreover, the Applicant failed to refute concerns for the contamination of groundwater sources.
1211. The findings of fact above demonstrate that Mauna Kea is a place of water. It is undisputed that the summit of Mauna Kea is above 5 aquifers for the Island of Hawaii.
1212. It is also undisputed that telescope activity on Mauna Kea has resulted in the release of hazardous chemicals into the environment.
1213. The overall cumulative impact of telescope activity on Mauna Kea is acknowledged as being “significant, substantial, and adverse.”
1214. The cumulative impacts to the traditional and cultural properties and associated traditional and customary Native Hawaiian practices resulting from the storage, use, and release of the large quantities hazardous materials has not been assessed.
1215. Based on the abovementioned facts regarding the traditional and customary practices, the use of the sacred waters, snow and ice from Lake Waiau and summit region, and the University’s failure to assess the significant impacts to those resources and practices from hazardous waste spills, human waste leech fields, and construction related contamination, the Applicant cannot its burden to

show that the land use “will not be materially detrimental to public health, safety and welfare.

1216. Because the Applicant cannot prove that the proposed TMT project would not be materially detrimental to the public health, safety, and welfare, this criterion is not satisfied and CDUA-HA-3568 cannot be granted.

C.TMT CDUA Inadequate and Incomplete

1217.

The CDUA was incomplete by failing to assess the TMT Project impacts upon the several hundred historic properties identified as contributing factors to the Mauna Kea Summit Region Historic District. (Ex. A-311, CDUA)

1218.

The CDUA was incomplete by failing to disclose the visual impacts of the TMT Project upon the several hundred historic properties and cultural resources on the northern plateau in the MKSR. (Ex. A-311, CDUA)

1219. The CDUA was incomplete by failing to assess the effect of TMT Project as a whole upon the Mauna Kea Summit Region Historic District. (Ex. A-311, CDUA)

1220. The CDUA was incomplete by failing to assess how the TMT Project would impact upon the integrity of the Historic District. (Ex. A-311, CDUA)

1221.

The CDUA is incomplete because an electromagnetic analysis and assessment for the TMT Project was not completed. (R. McLaren, Tr. Aug. 18, 2011, p. 180:24-25, 181:1-2)

1222. The CDUA was incomplete by failing to assess how the TMT Project would impact upon the integrity of the Mauna Kea Science Reserve as a TCP. (Ex. A-311, CDUA)

The CDUA was incomplete by failing to assess how the TMT Project would impact upon the eligibility of a TCP nomination. (Ex. A-311, CDUA)

1223.

In the CDUA, the Applicant downplayed the impact of the TMT Project upon historic properties by omitting all references to SIHP Site Nos. 16169 and 21447 that are shown on Figure 4.1 even though they are identified in Figure 5.1 of the FAIS-AP and in other archaeological reports. (Ex. A-311, CDUA, p. 4-2; Ex. A-28, FAIS-AP, p. 5-5)

The CDUA was incomplete by failing to disclose the impacts upon SIHP Site Nos. 16169 and 21447 that are shown on Figure 4.1 within the Mauna Kea Astronomy Precinct and within the vicinity of the TMT Project area. (Ex. A-311, CDUA, p. 4-2)

In the CDUA, the Applicant downplayed the impact of the TMT Project upon historic properties by intentionally removing the SIHP Site Nos. (16178, 16179, 16181, 16182, 21205) from Figure 4.1 even though they are identified in Figure 5.1 of the FAIS-AP and in other archaeological reports. (Ex. A-311, CDUA, p. 4-2; Ex. A-28, FAIS-AP, p. 5-5)

In the CDUA, the Applicant downplayed the impact of the TMT Project upon cultural resources (“find spots”) in the MKSR by intentionally eliminating all references from the CDUA and removing their site locations from Figure 4.1 even though they are identified in Figure 5.1 of the FAIS-AP and in other archaeological reports. (Ex. A-311, CDUA, p. 4-2; Ex. A-28, FAIS-AP, p. 3-12, 5-5; Ex. A-133, DAIS-MKSR, Appendix E)

The CDUA was incomplete by failing to disclose the impacts upon the several hundred cultural resources (“find spots”) in the MKSR. (Ex. A-311, CDUA; Ex. A-28, FAIS-AP, p. 3-12; Ex. A-133, DAIS-MKSR, Appendix E)

The CDUA was incomplete by failing to disclose the impacts upon cultural resources (“find spots”) Nos. 1997.07, 2005.03, 2005.05, 2005.06, 2005.07, 2005.08, & 2005.09 that are within the Mauna Kea Astronomy Precinct and within the vicinity of the TMT Project area. (Ex. A-311, CDUA; Ex. A-28, FAIS-AP, p. 5-5, 5-20)

1224. The CDUA was incomplete by failing to assess how the TMT Project would impact upon the eligibility of a National Register of Historic Places nomination. (Ex. A-311, CDUA)

In lieu of a habitat restoration plan, the TMT Project plan is to monitor arthropod activity in the vicinity of the portion of the Access Way that will impact Type 3 Wēkiu bug habitat. Ex A-308 FEIS, p. 3-73.

1225. Based on the findings of fact above, the TMT CDUA cannot be issued because it is also inadequate and incomplete.

IV. TMT VIOLATES HISTORIC PRESERVATION REQUIREMENTS

1226. Mauna Kea is a known burial ground. State law requires burial treatment plans for proposals occurring in known burial grounds. Yet, there is no burial treatment plan for the summit area of the Mauna Kea conservation district.
1227. Mauna Kea is a burial ground of our highest born and most sacred ancestors.
1228. Archaeologist [McCoy] noted the ...no shrines have been identified on top of cinder cones in the Mauna Kea Science Reserve...believing that these high and remote places were reserved for the burying of the dead.” (Brackets added) Ex. A21, App. N, p. 23
1229. Numerous burials and possible burials have been identified in the Mauna Kea conservation district.
1230. Chapter 6E, HRS, states “it shall be the public policy of this State to provide leadership in preserving, restoring, and maintaining historic and cultural property, to ensure the administration of such historic and cultural property in a spirit of stewardship and trusteeship for future generations, and to conduct activities, plans, and programs in a manner consistent with the preservation and enhancement of historic and cultural property.”
1231. HRS 6E-2 defines:
"Burial site" means any specific unmarked location where prehistoric or historic human skeletal remains and their associated burial goods are interred, and its immediate surrounding archaeological context, deemed a unique class of historic property and not otherwise included in section 6E-41.
"Historic preservation" means the research, protection, restoration, rehabilitation, and interpretation of buildings, structures, objects, districts, areas, and sites, including underwater sites and burial sites, significant to the history, architecture, archaeology, or culture of this State, its communities, or the nation.
"Historic property" means any building, structure, object, district, area, or site, including heiau and underwater site, which is over fifty years old.
"Mitigation plan" means a plan, approved by the department, for the care and disposition of historic properties, aviation artifacts, and burial sites or the contents thereof, that includes monitoring, protection, restoration, and interpretation plans.
1232. HRS 6E requires where known burials exist a burial treatment plan must be approved by the island burial council.

1233. In 1999, the Mauna Kea Summit Region Historic District (MKS RHD), which encompasses the adze quarry and many other significant sites in a vast cultural landscape, was determined eligible for listing on the National Register. (Ex. A-28, FAIS-AP, p. 1-1).
1234. The MKSRHD includes a concentration of significant historic properties that are linked through their setting, historic use, traditional associations, and ongoing cultural practices. The properties include shrines, adze quarry complexes and workshops, burials, stone markers/memorials, temporary shelters, historic campsites, traditional cultural properties, historic trails, and sites of unknown function. ((Ex. A-8, S. Collins DWT, p. 3)
1235. The Mauna Kea Summit Region Historic District is significant under all four National Register criteria, and criterion “e” of the Hawaii Administrative Rules, Chapter §13-275-6. The district is significant under criterion “a” because of the presence of the Mauna Kea.
1236. The TMT project does not meet the fifth criteria because it is not compatible with the locality and surrounding area. The TMT if built will sit right smack dab in the middle of what is called the ritual landscape or the ring of shrines that surround the set of summit cinder cones, also known as Kukahau'ula. These features are part of the Historic District, which contain many traditional cultural properties, which is further affirmed in the Cultural Impact Assessment and cultural reports that have been done throughout the years. (TR. Kealoha Pisciotta, September 30, 2011,p. 133:17-25,134:1-2)
1237. There are 29 historic properties with a total of 48 features recorded in the MKSR that are interpreted as Burials or Possible Burials. (Ex. A-133, DAIS-MKSR, p. 5-44 & 5-45)
- 1238.
- s. Although there are known burials in the MKSR, a burial treatment plan has not been prepared even though it has been recommended in PSCI’s survey report. (S. Collins, Tr. Aug. 17, 2011, p. 45:11-18)
1239. If the University is so worried about historic preservation of the area, why are they proposing to build the TMT in the middle of the historic district (on the plateau where the ring of shrines are located)? K. Pisciotta, WDT, June 28, 2011,p. 12.
- 1240.

1241. HAR 13-284-2 Definitions.

“Adverse effects” means any alteration to the characteristics of a historic property.”

“Detailed mitigation plan” means “the specific plan for mitigation, including but not limited to, a preservation plan, an archaeological data recovery plan, an ethnographic data recovery plan, a historic data recovery plan, a burial treatment plan, and an architectural recordation plan. The detailed mitigation plan serves as a scope of work for mitigation.”

“Mitigation” means “the measures taken to minimize impacts to significant historic properties. Mitigation may take different forms, including, but not limited to, preservation, archaeological data recovery, reburial, ethnographic documentation, historic data recovery, and architectural recordation.”

t. “Mitigation commitment” means “the commitment to the form or forms of mitigation to be undertaken for each significant historic property.”

1242. HAR 13-284-7 Determining effects to significant historic properties.

(b) Effects include, but are not limited to, partial or total destruction or alteration of the historic property, detrimental alteration of the properties’ surrounding environment, detrimental visual, spatial, noise or atmospheric impingement, increasing access with the chances of resulting damage and neglect resulting in deterioration or destruction. These effects are potentially harmful.

1243. Based on the above findings of fact regarding the lack of a burial treatment plan for the known burial that is all of Mauna Kea, the University cannot meet their burden under HAR §13-5-30(4) or under HAR 13-5-30(c)(8), or compliance with Chapter 6E of the State Historic Preservation Act.

V. TMT VIOLATES CONSTITUTIONAL PROTECTIONS FOR TRADITIONAL AND CUSTOMARY PRACTICES

1244. The record is replete with confirmation of the long-standing traditional and customary practices on Mauna Kea. The BLNR has an obligation to protect reasonable traditional and customary practices. The TMT proposal is not consistent with this obligation and thus cannot be granted.

BLNR Illegally Delegated its Authority to the University

1245. Article 12, Section 7. “The State reaffirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural and religious

purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights.”

1246. **In Public Access Shoreline Hawai'i v. Hawaii County Planning Commission, 79 Hawai'i 425, 903 P.2nd 1246 (1995), (hereafter “PASH”),** the Hawai'i Supreme Court stated:

- i. The State's power to regulate the exercise of customarily and traditionally exercised Hawaiian Rights, necessarily allows the State to permit development that interferes with such rights in certain circumstances... Nevertheless, the State is **obligated** to protect the reasonable exercise of customary and traditionally exercised rights of Hawaiians to the extent feasible.

1247. **In Ka pa`akai O Ka `Aina v. Land Use Commission (hereafter “Ka Pa`akai v. LUC”), 94 Hawai'i 31, 47, 7 P.3d 1068, 1068 (2000)** the Hawai'i Supreme Courts states:

- ii. To preserve and protect traditional and customary native Hawaiian rights, the Board examines the following factors:

1248. The identity and scope of cultural, historical, and natural resources in the application area, including the extent to which traditional and customary native rights are to have been exercised in the application area;

1249. The extent to which those resources, including traditional and customary native Hawaiian rights, will be affected or impaired by the proposed action; and

1250. The feasible action, if any to be taken to reasonably protect native Hawaiian rights if they are found to exist.

1251. **Ka Pa`akai v. LUC** further states:

- iii. Equally important, the Land Use Commission (“LUC”) made no specific findings or conclusions regarding the effects on or the impairment of any Article XII, section 7 [Hawai'i State Constitution] uses, or the feasibility of the protection for those rules. Instead, as mentioned, the LUC delegated unqualified authority to Ka`upulehu development (“KD”) ... This wholesale delegation of responsibility for the preservation and protection of native Hawaiian rights to KD, a private entity, however, was improper and misses the point...

1252. Chapters 205A-2 and 15, and 183C, HRS, obligate the BLNR to “to conserve, protect, and preserve the important natural resources of the State” that are designated as conservation districts. HRS 183C-1.

1253. The Applicant the University of Hawai'i at Hilo (UH), is seeking a conservation district use permit (CDUP) relative to CDUA HA-3568, on behalf of TMT Observatory Corporation ("TMT"). Ex. A-311, p.13, K-1 (CDUA)
1254. Upon approval of the UH Comprehensive Management Plan (UH CMP) the BLNR made the University Board of Regents (UH BOR) Responsible for implementing the CMP, in accepting that responsibility the UH BOR delegated implementation of the CMP through normal UH governance channels to UHH, OMKM, MKMB, and also assigned two members of the UH BOR to sit as ex-officio, non-voting members on the MKMB. Ex. A-308, p.3-128
1255. If a CDUP for the TMT Project were granted UHH would be the named permittee, but the TMT Observatory Corporation would be the entity constructing and operating the TMT. Tr. Nagata, 8.17.11, p. 215:6-22.
1256. There is no dispute the University of Hawai'i, is the only Applicant named on the Conservation District Use Application for the proposed TMT Telescopes Project.
1257. There is no dispute the TMT Corporation is in fact not named as the "applicant" on the CDUA-HA-3568.
1258. The record of the BLNR's decision to approve the UH CMP and CDUA-HA-3568 did not include specific findings of fact as to three elements of the *Ka Pa`akai* due process analysis. (Ex. B-41, B-42). Indeed, the Applicant's admitted lack of process for addressing claims of traditional and customary Native Hawaiian practitioners harmed by decisions made ostensibly in compliance with the UH CMP indicates that the appropriate due process analysis required by *Ka Pa`akai* has not been met in this case. Thus, approval of CDUA-HA-3568 would further the inappropriate "wholesale delegation" BLNR's legal obligations, in violation of the constitutional due process rights of Native Hawaiian practitioners.

The cultural practitioner petitioners engage in constitutionally protected traditional and customary practices

1259. As the findings of fact show, the record is replete with confirmation that the Native Hawaiian petitioners in this case engage in constitutionally protected traditional and customary practices.
1260. The findings of fact above demonstrated that:
1261. the entire conservation district of Mauna Kea is a known sacred landscape with viewplanes associated with navigation and many ancient trails (FOF #103)

1262. the historic properties in the Mauna Kea Science Reserve are “are of importance to Native Hawaiians because they possess traditional cultural significance derived from associated cultural practice and beliefs,” (FOF #103)
1263. the traditional and customary and religious practices include the collection of water, depositing piko, burial ceremonies, and religious observances. (FOF #104)
1264. these ancient practices continue today and have evolved into contemporary practices (FOF #104)
1265. the construction of ahu, releasing of cremated remains, and other contemporary cultural practices evolved from ancient practices and **considered reasonable practices**. (FOF #105, #106)
1266. these practices are of the class of practices protected by Article XII, sec. 7 of the Constitution and the related caselaw. (FOF #107).
1267. These findings of fact demonstrate that the current practices of some of the Petitioners were previously identified as NHTCP (thus meeting both the Constitutional requirements and court requirement (PASH and State v. Hanapi)) and have been known to the University for more than a decade.

BLNR must reasonably protect traditional and customary practices

1268. Article 11, Section 1. “For the benefit of present and future generations, the State and its political subdivisions shall conserve and protect Hawaii's natural beauty and all natural resources, including land, water, air, minerals and energy sources, and shall promote the development and utilization of these resources in a manner consistent with their conservation and in furtherance of the self-sufficiency of the State. All public natural resources are held in trust by the State for the benefit of the people.
1269. Article 12, Section 4. “The lands granted to the State of Hawaii by Section 5(b) of the Admission Act and pursuant to Article XVI, Section 7, of the State Constitution, excluding therefrom lands defined as "available lands" by Section 203 of the Hawaiian Homes Commission Act, 1920, as amended, shall be held by the State as a public trust for native Hawaiians and the general public.”
1270. In *In Re Water Use Permit Applications*, 94 Hawai`i 97, 9 P.3d 409 (2000) ("*the Waiahole Ditch Case*"), the Hawai`i Supreme Court recognized that public trust doctrine was "a fundamental principle of constitutional law in Hawai`i." Haw. Const., Art.XI, section 1, P.133, 9 P.3d at 444.
1271. The duties imposed by the public trust doctrine in this case are not supplanted or made superfluous by HRS Chapter 183C or the regulations promulgated there under. "Mere compliance by [agencies] with their legislative authority is not sufficient to determine if their actions comport with the requirements of the public trust doctrine. The public trust doctrine at all times

forms the outer boundaries of permissible government action with respect to public trust resources." *Id.* at 132, 9 P.3d at 445 (citing to *Kootenai Envtl. Alliance v. Panhandle Yacht Club, Inc.*, 105 Idaho 622, 671 P.2d 1085, 1095 (Idaho 1983)). Thus, BLNR, like the Commission on Water Resource Management in the *Waiahole Ditch Case*, has an "affirmative duty" to take the public trust into account in permitting the use of public lands located in the conservation district and **"to protect the public trust uses whenever feasible."**

1272. There is no dispute that Mauna Kea is a "public natural resource" of the class protected under Article XI, section 1 of Hawaii's Constitution. See, *Waiahole Ditch Case* at 133, 9 P.3d at 444. Mauna Kea is part of the "ceded lands trust," lands ceded by the federal government back to the State of Hawai'i by Section 5(b) of the Admission Act and pursuant to Article XVI, Section 7, of the Hawai'i Constitution. These lands are held by the State as "a public trust for native Hawaiians and the general public." Haw. Const., Art. XII, sec. 4. Mauna Kea has also been designated a National Natural Landmark because of its unique geological and biological features. It is eligible for listing in the National Register of Historic Places as a traditional cultural property. There is no doubt that it is a public natural resource of invaluable worth to the public and Native Hawaiians.

1273. Therefore, BLNR must independently uphold the Constitutional mandate that it "shall conserve and protect Hawaii's natural beauty and all natural resources...in a manner consistent with their conservation." Haw. Const., Art. XI, sec. 1.

VI. Violations of Surety, Lease, and Obligations to Public and Native Hawaiian Beneficiaries

1274. The Native Hawaiians and the general public are the two named beneficiaries of the public trust established in the Hawaii Admissions Act. Section 5(f), of the Act, includes support programs "for the betterment of the conditions of native Hawaiians." As both public and Native Hawaiian beneficiaries of this trust, Petitioners have a right to judicial review of actions of the trustee that result in waste of or deprivation of income from the assets. As beneficiaries of this trust, they have a right to reasonable revenues from the lease of public lands subject to the provisions of the trust.

1275. Section 171-17 and -18, HRS, require the DLNR to assess and collect fair market lease rent, to be deposited in the Public Trust Land Fund.

1276. HRS 171-17 (a) The appraisal of public lands for sale or lease at public auction for the determination of the upset price may be performed by an employee of the board of land and natural resources qualified to appraise lands, or by one but not more than three disinterested appraisers whose services shall be contracted

for by the board; provided that the upset price or upset rental shall be determined by disinterested appraisal whenever prudent management so dictates. No such lands shall be sold or leased for a sum less than the value fixed by appraisal; provided that for any sale or lease at public auction, the board may establish the upset sale or rental price at less than the appraisal value set by an employee of the board and the land may be sold or leased at that price. The board shall be reimbursed by the purchaser or lessee for the cost of any appraisal required to be made by a disinterested appraiser or appraisers contracted for by the board. (a) Have the appraisal of public lands for sale or lease at public auction for the determination of the upset price may be performed by an employee of the board of land and natural resources qualified to appraise lands, or by one but not more than three disinterested appraisers whose services shall be contracted for by the board.

1277. HRS 171-18. All funds derived from the sale or lease or other disposition of public lands shall be appropriated by the laws of the State; provided that all proceeds and income from the sale, lease, or other disposition of lands ceded to the United States by the Republic of Hawaii under the joint resolution of annexation, approved July 7, 1898 (30 Stat. 750), or acquired in exchange for lands so ceded, and returned to the State of Hawaii by virtue of section 5(b) of the Act of March 18, 1959 (73 Stat. 6), and all proceeds and income from the sale, lease or other disposition of lands retained by the United States under sections 5(c) and 5(d) of the Act and later conveyed to the State under section 5(e) shall be held as a public trust for the support of the public schools and other public educational institutions, for the betterment of the conditions of native Hawaiians as defined in the Hawaiian Homes Commission Act, 1920, as amended, for the development of farm and home ownership on as widespread a basis as possible, for the making of public improvements, and for the provision of lands for public use.
1278. There are at least 13 leases for telescope structures on the public lands of Mauna Kea. These sub-leases are made between the State, UH and foreign and non-state governments and corporations that have no such protection under the relevant sections of the Admissions Act, including Section 5(f) of the Act.
1279. The leases are signed by a representative of DLNR, a representative of the University, and representatives of the telescope owners/operators. Ex. B-7.
1280. The annual lease rent paid by of the existing telescope owners/operators is either \$1 or less. Exhibit B-2, B-3, B-4, B-5, B-6, and B-7.
1281. While the University may benefit from the use of public trust lands for educational purposes under Section 5(f) of the Hawai'i Admissions Act, however, the law does not provide private corporations and foreign countries that same privilege.

1282. The University may not extend their public trust lands privilege to non-state and foreign government and or corporations.
1283. As is evidenced in the sub-lease agreements the University is not assessing and collecting fair market lease rent and depositing it into the Public Trust Lands Fund for public purposes pursuant to HRS 171.
1284. As is evidenced in the sub-lease agreements the DLNR is not assessing and collecting fair market lease rent and depositing it into the Public Trust Lands Fund for public purposes pursuant to HRS 171.
1285. It is undisputed that fair market lease rent has not been collected by DLNR for the use of the public lands of Mauna Kea for astronomy related activities, commercial tours, and other revenue generating uses.
1286. BLNR is required to assess and collect fair market lease rent to be deposited into the Public Trust Lands Fund to be used for specified public uses, regardless of the fact that the University under HRS 304, may also charge users rent.
1287. DLNR's 1977 management plan for the Mauna Kea Conservation District required that no application shall have final approval without the applicant having first filed with the board adequate security equal to the amount of the contract to construct the telescope facilities, support facilities and to cover any direct or indirect costs attributed to the project.
1288. Although the TMT Observatory Corporation has alluded to pay an unspecified amount of "substantial rent," the University is actually the Applicant on this CDUA, and the UHH has not provided at security deposit.
1289. Moreover HRS 171, requires all lease rent for the use of public trust lands to be based on the fair market value. This means rent is not based on what the Applicant or the TMT Corporation is willing to pay.
1290. Neither the CMP nor the CDUA ensure that either the general public or Native Hawaiian beneficiaries receives their constitutionally guaranteed portion of all money generated from the use of former crown and government lands of which Mauna Kea is a part as is provide under the law (HRS 171).
1291. The BLNR, has a fiduciary duty to protect the interests of its beneficiaries.

DECISION AND ORDER

Based on the above Findings of Fact and Conclusions of Law the University of Hawai'i's Conservation District Use Permit Application (HA-3568) is deficient and hereby DENIED/REVOKED.